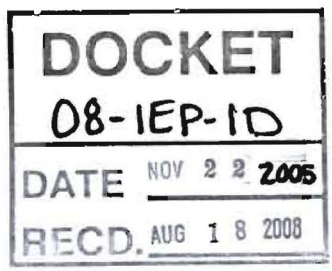
Discount Rates in Economic Assessment of Transmission Projects



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on behalf of
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California Public Utilities Commission
A.05-04-015, I.05-06-041
DPV2 and Methodology for Economic Assessment of Transmission Projects

November 22, 2005

I. Introduction

This testimony is presented by William B. Marcus, Principal Economist of JBS Energy, Inc. on behalf of The Utility Reform Network (TURN). Mr. Marcus has 27 years of experience in this industry, has appeared before this Commission on many occasions, and has filed testimony or formal comments before about 35 federal, state, provincial, and local courts and regulatory bodies in the U.S. and Canada. Mr. Marcus' qualifications are attached. (Attachment 1) Prior to becoming specifically involved in energy economics in California, Mr. Marcus also extensively analyzed the use of discount rates as an employee of the Kennedy School of Government at Harvard University, writing several sets of teaching notes and case studies addressing the topic.[1]

The ALJ's Ruling addressing Phase 1 testimony in this proceeding states:

> The Energy Action Plan II adopted by the Commission and the California Energy Commission describes that a range of discount rates could be used to evaluate transmission lines. Parties should address in their Phase 1 direct testimony the issue of discount rates, including the appropriateness of using a social discount rate versus the utility cost of capital and, if the Commission uses a social discount rate in analyzing DPV2 or other transmission lines, what that discount rate should be.

The purpose of my testimony is to present TURN's position on the use of discount rates in the analysis of costs and benefits of transmission lines. Our position is that the only appropriate discount rate should be the utility's cost of capital – the actual cost that ratepayers would pay.

II. The Energy Action Plan II and Strategic Benefits

The Energy Action Plan II is a policy document to coordinate implementation of state energy policies and reflects cooperation among state agencies, including the CPUC and the California Energy Commission. The EAP II supports a loading order in which

[1] Documents that remain in print today include W. Marcus, "Note on Benefit Cost Analysis" (Cambridge, MA: Kennedy School of Government Case Program, Case No. N15-76-110), 1977. W. Marcus, "Note on the Use of Discount Rates in the Federal Government" (Cambridge., MA: Kennedy School of Government Case Program, Case No. N15-77-143), 1977. and W. Marcus, "Note on Environmental Enforcement Programs" (Cambridge, MA: Kennedy School of Government Case Program, Case No. N15-77-170), 1977.

and reduce the need for additional infrastructure in California. (2005 Strategic Transmission Investment Plan, p. 6).

In the 2004 Integrated Energy Policy Report Update we find the following justification for the use of a social discount rate for transmission planning and evaluation (p.31):

> The Energy Commission believes using a social discount rate is an appropriate approach for valuing the long useful life and the public goods nature of transmission projects. The costs and benefits of transmission lines under the restructured market are no longer limited to a sponsoring utility or its retail customers, as they were when utilities were vertically integrated. On the CA ISO grid, the costs of transmission upgrades are now spread among all users through transmission access charges. The benefits of these transmission investments cannot be denied to any retail customer or generation owner, and as a result, transmission lines have increasingly become a public good.
>
> However, the current discount rate used to evaluate transmission projects at the CA ISO and CPUC is based on the utility industry's opportunity cost of capital, which effectively shortens the period over which benefits accrue. Decision makers must weigh the costs and benefits to society over the full useful life of these capital-intensive projects. Doing otherwise biases the decision against investment.
>
> Social discount rates are used to appraise the economics of public projects in other sectors such as transportation, water resource development, and land-use. For example, in its building standards, the Energy Commission uses a three percent discount rate for testing cost-effectiveness that reflects a real (inflation-adjusted), after-tax rate that is more reflective of a social discount rate.
>
> The Energy Commission recommends using a social discount rate, comparable to that used for its buildings and appliance standards, for evaluating the costs and benefits of transmission investments in a properly focused state transmission planning process.

- This is the rate of return that users of the system must pay to use utility capital for the project. It is inequitable if a project is built that policy makers find to be barely "cost-effective" using a discount rate of 3% while the users of the project must pay 10% for use of the capital and would therefore have preferred economically that the project not be built so that they would otherwise have lower rates over the long term.

In the case of investments within the electricity sector, however, we are making tradeoffs of one type of investment versus another at the societal level (for example transmission vs. distribution vs. energy efficiency). It is important that the same discount rate be used in these tradeoffs to properly allocate limited resources.

The argument that the entire useful life of the asset is not considered unless a social discount rate is used is specious. The distant future is not given as much weight when a utility cost of capital is used as the discount rate, but to claim that it is totally unweighted is not correct.

Moreover, contrary to the CEC's statements in the IEPR, the Federal Government does not use a social rate of time preference. Circular A-94 of the Office of Management and Budget (first issued in the 1970s and last revised in 1992) lays down the following specific guidelines for public investment and regulatory analyses:

> b. **Public Investment and Regulatory Analyses**. The guidance in this section applies to benefit-cost analyses of public investments and regulatory programs that provide benefits and costs to the general public. Guidance related to cost-effectiveness analysis of internal planning decisions of the Federal Government is provided in Section 8.c.
>
> In general, public investments and regulations displace both private investment and consumption. To account for this displacement and to promote efficient investment and regulatory policies, the following guidance should be observed.
>
> 1. **Base-Case Analysis**. Constant-dollar benefit-cost analyses of proposed investments and regulations should report net present value and other outcomes determined using a real discount rate of 7 percent. This rate approximates the marginal pretax rate of return on an average investment in the private sector in recent years. Significant changes in this rate will be reflected in future updates of this Circular.

The CEC points out that it uses a social discount rate for its building standards. But this is not a good argument for also using a social discount rate when deciding whether to build a transmission line. First, it is noteworthy that utility-funded conservation programs have not been evaluated using a social discount rate but instead have used a utility-cost-of-capital discount rate under Total Resource Cost test in the CPUC/CEC Standard Practice Manual for the last 20 years.[7] Why should utility-owned transmission lines be any different?

More importantly, building and appliance standards can be clearly distinguished from the decision to build a transmission line. High individual consumer discount rates indicate a preference for benefits today rather than in the future[8] that is unhealthy if the consequences are taken to a societal level, especially for standards that could provide savings for a long time. The level of energy conservation included in a building envelope is largely an irreversible decision. If a building is not constructed to meet certain specifications (e.g., if it were built with R-7 wall insulation instead of R-19), it would never be cost-effective to go back to tear out the old wall insulation and retrofit the building to meet the R-19 standard, even though it might be quite cost-effective to install R-19 insulation when the wall is being built in the first place. Similarly, a decision to install a refrigerator that is relatively inefficient is largely irreversible for the life of the equipment, since it will not be cost-effective to scrap the appliance until at least close to the end of its useful life simply to gain the economic benefit of using less energy. This phenomenon is called a "lost opportunity" in the terminology of energy conservation program evaluation. Failure to achieve all lost opportunities through comprehensive programs is "cream skimming." Use of a social rate of time preference to give explicit consideration of the future may be reasonable when evaluating irreversible decisions (either involving energy consumption investments or long-lasting environmental impacts), but that should not cause the indiscriminate use of such discount rates in cases

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[7] http://www.energy.ca.gov/greenbuilding/documents/background/07-J_CPUC_STANDARD_PRACTICE_MANUAL.PDF

[8] Customers will tolerate interest rates on credit card debt at levels of 17-19%. Moreover, discount rates observed from consumers' decisions on conservation investments are extremely high reflecting issues such as expected length of residency in the property versus life of the investment, lack of information, and lack of capital to invest. Other issues that can cause apparently high discount rates for conservation include split incentives between landlords vs. tenants and builders vs. new owners.

the construction of new transmission facilities shall be deemed to be necessary to the provision of electric service for purposes of any determination made under Section 1003 if the commission finds that the new facility is necessary to facilitate achievement of the renewable power goals established in Article 16 (commencing with Section 399.11).

The Commission has already determined that this section applies to network transmission facilities proposed in either a CPCN or PTC application.[11] As a result of this section, significant transmission upgrades could be deemed 'necessary' based solely on the addition of new renewable generation procured through competitive solicitations."

Again, using the rationale that transmission supports renewables as a justification for a low social discount rate is double-counting this benefit, because transmission support of renewables is already internalized by §399.25 (a).

Thus upon further examination it is obvious that many of the alleged strategic benefits of transmission have already been incorporated into the planning process in various ways. **We do not see large unquantified strategic benefits that justify a lower social discount rate.**

2. The Insurance benefit of transmission should be calculated as Incremental to other Insurance Programs.

Since the time of the energy crisis California has undertaken many steps to reduce exposure to high electricity prices and market manipulation. Some steps include:

- A requirement that load-serving entities contract for capacity sufficient to meet 90% of the expected load one year in advance, and procure a maximum of 5% of energy on the spot market (D.04-01-050);
- A requirement that planning reserve margins of 15-17% be maintained as of June 2006 (D.04-10-035);
- A demand response goal of 5% of system peak by 2007 (D.03-06-032 – this goal may be revised); and

[11] D.03-07-033, Ordering Paragraph 1 ("The provisions of § 399.25 apply to network transmission facilities that come before the Commission in the form of a Certificate of Public Convenience and Necessity (CPCN) or Permit to Construct (PTC) application. "Network" transmission facilities are defined as those that are needed to ensure reliable electric service and full delivery of a generator's output with the addition of generation. The provisions of § 399.25 do not apply to transmission facilities needed to bring power from the plant to the first point of interconnection with the existing transmission grid.")

projects. The ISO incorporates transmission planning criteria from NERC that indicate that reliability projects should be built if the loss of one system component (N-1) would result in loss of firm load.[12] Curtailment of firm load would only be allowable if, on a planning basis, there was loss of two or more system elements. Projects built for economic reasons, however, are the ones for which a lower discount rate is being considered here. Although the existence of a new transmission line may provide insurance against outages, its incremental insurance value would only be in the low probability event that two or more elements were already out or if generation were available elsewhere in the west for which there was no other transmission path into California – otherwise it could be built as a reliability project.

3. Environmental benefits do not justify a social discount rate; both environmental benefits and costs should be explicitly evaluated

Environmental benefits are also identified as a strategic factor that could support use of a social discount rate. We should not skew the analysis, however, to incorporate environmental benefits without accounting for the environmental and social costs of transmission.

As discussed above, the first-best method would be to directly include quantification of environmental consequences. The quantification of emissions consequences of different scenarios is a feature that could be introduced into the ISO TEAM methodology but has not yet been implemented. Absent a complete analysis it should not be assumed, however, that the environmental consequences of transmission would be a net benefit. To the extent that increased transmission permits larger imports from the Southwest of coal-fired power as well as electricity from gas-fired resources that do not include SCR as in California, the environmental consequences should not be automatically presumed to be positive on balance to the western region as a whole. **It would be an error to assume environmental benefits as a reason to implement a social discount rate; environmental costs must also be included**.

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[12] See http://www.caiso.com/docs/2002/07/12/2002071215445516361.pdf. The WECC/NERC planning criteria are available at: http://www.wecc.biz/documents/library/procedures/CriteriaMaster.pdf. See Table I.

V. Considerations If a Social Discount Rate is Applied

If a social discount rate is used to evaluate transmission, despite TURN's objections, several improvements must be made in the cost/benefit methodology.

A. An Analysis Using a Utility Discount Rate Should Also Be Provided.

The impact of the choice of discount rate should be made explicit in the decision-making process if a social discount rate is to be used as part of the evaluation process. Therefore, analyses should be provided at both a social-rate-of-time-preference discount rate and a utility discount rate (in the range of 9% nominal or 6-7% real), so that the impact of the choice of discount rate is transparent to policy-makers.

B. Risk Must be Incorporated

Given that a low social discount rate weighs future benefits more than using the cost of capital as a discount rate, the fact that the "future benefits" have an associated risk should be accounted for if a social discount rate is used. For example, if the alleged transmission benefit of reducing market power is measured by price differences (with and without transmission) at different hubs, there is a risk that the expected price difference may not materialize. Several factors could affect such expected market power, such as another generator locating in the area or a transmission line built by a third party, or even (looking out over the entire 50-year time stream of a project) that distributed generation will supplant a significant portion of bulk transmission demands. A project with a relatively risky stream of potential benefits, such as one expecting to alleviate market power, should be differentiated from a project that has a less risky benefit stream. If risk is not incorporated, future benefits will be overestimated.

C. Benefits Should Exceed Costs by a Significant Amount

In traditional analysis a project is considered cost-effective if the benefit/cost ratio is 1 or more, e.g. quantified benefits at least equal costs. With increased benefits as a result of using a social discount rate, many more projects would look beneficial and there is the possibility that limited capital may not be allocated to the most beneficial projects.

Attachment 1

Qualifications of William B. Marcus, Principal Economist, JBS Energy, Inc.

William B. Marcus has 27 years of experience in electric and gas utility issues.

Mr. Marcus graduated from Harvard College with an A.B. magna cum laude in economics in 1974 and was elected to Phi Beta Kappa. He received an M.A. in economics from the University of Toronto in 1975.

In July, 1984, Mr. Marcus became Principal Economist for JBS Energy, Inc. In this position, he is the Company's lead economist for all utility issues.

Mr. Marcus is the co-author of a book on utility restructuring for the National Association of Regulatory Utility Commissioners. He wrote a report on Performance Based Ratemaking for the Energy Foundation and presented a paper on stranded costs to the National Council of State Legislatures. He also analyzed restructuring and stranded cost issues in California, Nevada, Texas, Connecticut, New Jersey, Virginia, Alberta and Ontario for consumer, environmental, and independent power clients.

Mr. Marcus has prepared testimony and formal comments submitted to the Federal Energy Regulatory Commission, the National Energy Board of Canada, the U.S. Bureau of Indian Affairs, the Bonneville Power Administration, the U.S. District Court in San Diego, Nevada County California municipal court, the California Energy Commission (CEC), Sacramento Municipal Utility District (SMUD), Transmission Agency of Northern California, the state of Nevada's Colorado River Commission, environmental regulatory boards in Ontario, Manitoba, and Nova Scotia; and regulatory commissions in Alberta, Arizona, Arkansas, British Columbia, California, Colorado, Connecticut, the District of Columbia, Hawaii, Manitoba, Maryland, Massachusetts, Nevada, New Jersey, New Mexico, North Carolina, Northwest Territories, Nova Scotia, Ohio, Oklahoma, Ontario, Oregon, South Carolina, Utah, Vermont, Virginia, Washington, Wisconsin, and Yukon. He has testified on issues including utility restructuring, resource planning, load forecasts, powerplant and transmission line need and cost-effectiveness, environmental effects of electricity production, evaluation of conservation potential and programs, design of Performance-Based Ratemaking programs, utility-affiliate transactions, other revenue issues, avoided cost, and gas and electric cost of service and rate design.

From 1975 to 1978, Mr. Marcus was a research analyst at the Kennedy School of Government, Harvard University, where he analyzed energy, environmental, and urban policy issues and prepared materials for teaching analytical techniques such as benefit-cost analysis.

From July, 1978 through April, 1982, Mr. Marcus was an economist at the CEC, first in the hydroelectric and cogeneration development program and later a senior economist in the CEC's Executive Office. He testified on purchased power pricing, analyzed transmission projects, alternative energy resources, and conservation programs, and managed interventions in utility rate cases.

From April, 1982, through June, 1984, he was the principal economist at California Hydro Systems, Inc., an alternative energy project consulting and development company. He prepared financial analyses of specific projects, helped developers negotiate utility contracts, and provided consulting services on utility economics.

In 1991-92, Mr. Marcus served on the SMUD Rate Advisory Committee. He now serves on advisory committees for Woodland Community College and the City of Woodland.