

# the Electricity

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J O U R N A L

## *Externalities— The Next Wave in Planning*

The True Cost of Electric  
Power

*By Richard L. Ottinger*

What States Are Doing  
About Externalities

*By S. Cohen, J. Eto,  
C. Goldman, J. Beldock and  
G. Crandall*

Estimating  
Environmental Costs

*By Shepard C. Buchanan*

Valuing Externalities in  
Bidding in New York

*By Sury Putta*

A Selective Look at  
Current Practice

*By L.O. Foley and A.D. Lee*

Blunting Risk With  
Caution in Planning

*Steve Brick and  
George Edgar*

### *In the News:*

A Carbon Tax to Ease the  
Deficit?

Idaho Power's Strategic  
Intertie

FERC to WSPP:  
"Open Up"

Iowa Merger Raises  
Questions

# Environmental Externalities: What State Regulators Are Doing

*State regulatory bodies are rapidly adopting tools to address environmental externalities in utility planning. But the nature of state responses has varied widely, and some of the states that will need capacity soonest have not yet begun to consider how—or whether—to act.*

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Partly in response to increased public concern about the impacts of acid rain<sup>1</sup> and global climate change, regulatory commissions in many states are now grappling with difficult questions of how to include environmental externalities in utility resource planning.

In order to understand current activities in this area, the Energy Conservation Committee of the National Association of Utility Regulatory Commissioners (NARUC) has worked with Lawrence Berkeley Laboratory (LBL) and staff at the Michigan Public Service Commission in surveying state PUC practices in this area. LBL conducted a telephone and

mail survey of PUCs<sup>2</sup> which investigated the role of environmental externalities in utility resource planning, acquisition processes, and ratemaking. The survey focused on PUC activities, although most respondents also reported on the role and efforts of other state agencies.

In this article, we report on approaches adopted by PUCs that go beyond existing federal and state environmental standards for siting and operation of electric generation resources. At the outset, it should be noted that PUCs often start from different baselines in addressing environmental effects that are not internalized, because some states have

adopted more comprehensive or strict environmental protection legislation than others. This survey represents a snapshot of current practices in a rapidly changing area.

### I. Summary of PUC Activities

Figure 1 (on page 26) presents our assessment of the status of PUC and utility activities for each state with respect to environmental externalities as of April 1990. Table 2 (page 27) shows this information, along with PUC perceptions of generating capacity needs over the next ten years and a description of the methods used to incorporate environmental factors in states with operational approaches.

**Operational.** PUCs or utilities in 17 states have adopted rules or policies in this area (status = "Operational"). However, even in those states that were categorized as having operational approaches, experience is relatively limited and major resource acquisition decisions by utilities are some years off in several states.

In eight of these states, PUCs or utilities have developed quantification procedures for including environmental costs in resource planning and/or acquisition processes (e.g., California, Colorado, Massachusetts, New York, New Jersey, Oregon, Vermont, and Wisconsin). These efforts have increased significance in those states where utilities are proposing to or have actually begun the process of acquiring additional electric

resources in the near term (e.g., New York, New Jersey, and Wisconsin), because the adopted rules will have an immediate effect on the selection of resource options.

**Developing.** The survey revealed that PUCs in seven states were in the process of developing strategies to incorporate externalities or had tried unsuccessfully to do so in the past (status = "Developing").

The remaining 24 PUCs were classified in two other categories: (1) "Awareness," which was assigned where there was some awareness of the issue and some progress had been made or was expected, and (2) "None," where we were not aware of any efforts by PUC to include environmental concerns. Of these 24 states, 16 expect to need peaking or baseload capacity within the next ten years. Many of these 16 now obtain more than half their electricity from coal (Alabama, Delaware, Georgia, Indiana, Missouri, North Dakota, South Dakota, and West Virginia).

These states already face potentially large compliance costs with the passage of new federal

clean air legislation and will need to consider carefully the environmental impacts of new resource additions.

### II. Approaches for Incorporating Environmental Externalities

The survey results indicate that PUCs are exploring a broad range of methods to incorporate environmental concerns. Overall, the approaches affect two areas of utility regulation: (1) resource planning and acquisition processes and (2) ratemaking. We identified three basic methods that have been used by state PUCs and utilities in the context of resource planning/acquisition: —*Qualitative treatment* during the resource planning process; —*Direct quantification* of environmental costs and impacts as part of integrated resource planning and/or competitive resource acquisition processes, typically through weighing environmental considerations in a scoring system; and —*Use of a percentage adder/subtractor* which is applied to the capital cost of supply- or demand-side resources during the planning process.

The approaches are not mutually exclusive. For example, in Connecticut, the Department of Public Utility Control has authorized a higher rate of return for utility demand-side investments; utilities have also been asked to evaluate externalities qualitatively in their resource plans.

**TABLE 1: Criteria for Assessing the Status of PUC Activities**

| Category | Definition  |
|----------|---|
| O        | Operational: approaches developed or rules passed                       |
| D        | Developing: not yet implemented or failed to pass                       |
| A        | Awareness: no formal procedures   |
| N        | None: not aware of any efforts by PUC to include environmental concerns |

### A. Incorporating Environmental Concerns in Planning and Resource Acquisition

In this section, we describe the various methods being used to incorporate environmental considerations in utility resource planning in more detail by discussing examples from some of the more active states.<sup>3</sup>

**1. Qualitative Treatment.** Qualitative treatment of environmental externalities has been adopted by PUCs in six states and was the most common approach. For example:

Nevada has adopted regulations that give the commission broad discretion to "give preference to the measures . . . that provide the greatest economic and environmental benefits to the state."<sup>4</sup>

Arizona's Corporation Commission considers environmental externalities, such as SO<sub>2</sub> and CO<sub>2</sub> emissions, in its least-cost planning activities. The Commission's rules do not specify a method by which such externalities must be considered.

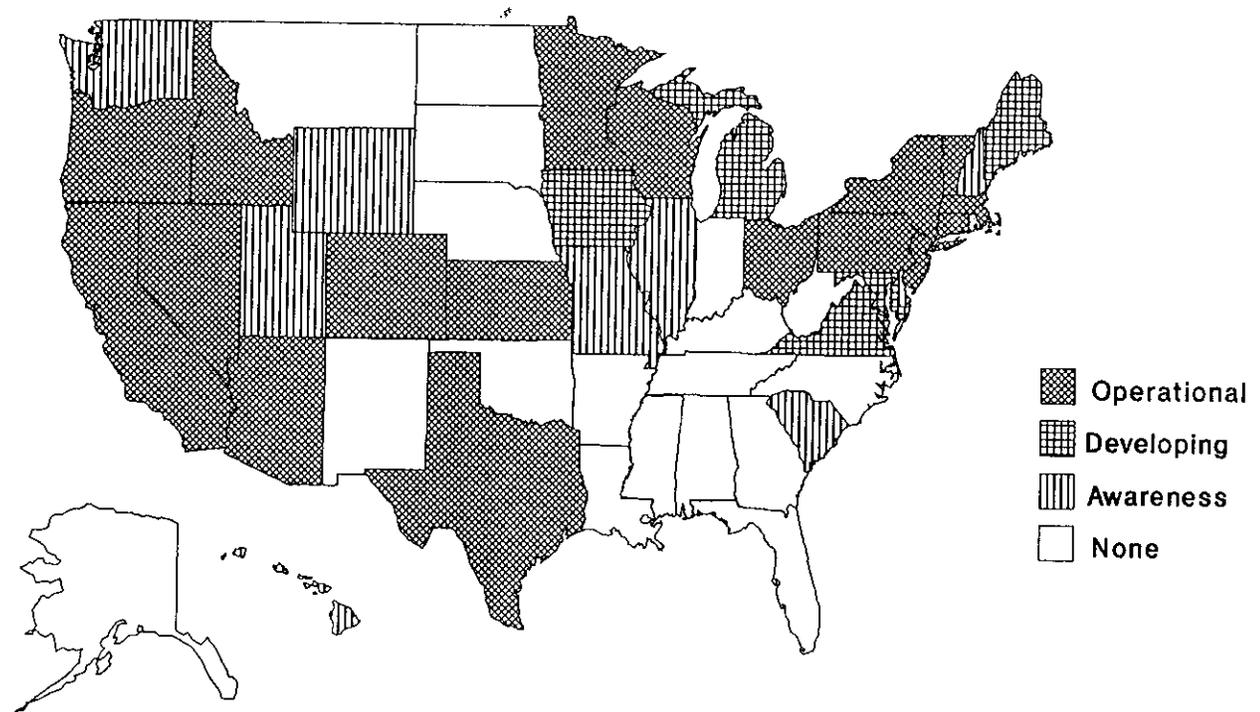
Minnesota's Public Utilities Commission proposed a resource planning rule in December 1989 that would incorporate environmental considerations. Additionally, in order to reduce the damage from acid rain, the legislature passed a bill in 1986 that caps SO<sub>2</sub> emissions from the state's two main power plants.

**2. Percentage Adder.** Some states use a percentage adder that increases the cost of supply-side resources or decreases the cost of

demand-side resources in the utility's planning process. Percentage adders that have been adopted by states thus far have generally been technology-based. A technology-based adder treats all projects using the same technology similarly. For example, a DSM option may be given a credit and allowed "X" percent higher cost in evaluating cost-effectiveness compared to supply-side resources. The principal advantage of a technology-based adder is its relative simplicity. Its drawback is that it is less accurate; different projects within a type of technology may have a pollutant level that varies as a function of project size or design, for example.<sup>5</sup>

The Northwest Power Planning Council (NPPC) was the first entity to use this type of ap-

FIGURE 1: Status of State PUC Activities



**TABLE 2: Status of PUC Activities**

| State                | Anticipated Capacity Needed Within 10 Years | Status            | Approach to Incorporating Externalities |
|----------------------|---|-------------------|---|
| ALABAMA              | Peaking                                     | None              |   |
| ALASKA               | Peaking                                     | None              |   |
| ARIZONA              | Peaking                                     | Operational       |   |
| ARKANSAS             | Neither                                     | None              | Qualitative                             |
| CALIFORNIA           | Peaking                                     | Operational       | Env. adder to bidding system            |
| COLORADO             | Peaking                                     | Operational       | QF bid evaluation                       |
| CONNECTICUT          | Neither                                     | Operational       | Higher ROR, qualitative                 |
| DELAWARE             | Baseload, Peaking                           | Awareness         |   |
| DISTRICT OF COLUMBIA | Baseload, Peaking                           | Developing        |   |
| FLORIDA              | Baseload, Peaking                           | None              |   |
| GEORGIA              | Baseload, Peaking                           | None              |   |
| HAWAII               | Baseload, Peaking                           | Awareness         |   |
| IDAHO                | Baseload, Peaking                           | Operational       | Unspecified higher ROR                  |
| ILLINOIS             | Baseload, Peaking                           | Awareness         |   |
| INDIANA              | Baseload, Peaking                           | None              |   |
| IOWA                 | Peaking                                     | Developing        |   |
| KANSAS               | Baseload, Peaking                           | Operational       | Higher ROR                              |
| KENTUCKY             | Neither                                     | None              |   |
| LOUISIANA            | Neither                                     | None              |   |
| MAINE                | Baseload, Peaking                           | Developing        |   |
| MARYLAND             | Baseload, Peaking                           | Developing        |   |
| MASSACHUSETTS        | Baseload, Peaking                           | Operational       | Bid evaluation                          |
| MICHIGAN             | Baseload                                    | Developing        |   |
| MINNESOTA            | Baseload, Peaking                           | Operational       | Qualitative                             |
| MISSISSIPPI          | Neither                                     | None              |   |
| MISSOURI             | Peaking                                     | Awareness         |   |
| MONTANA              |   | No Response       |   |
| NEBRASKA             |   | Does not regulate |   |
| NEVADA               | Baseload, Peaking                           | Operational       | Qualitative                             |
| NEW HAMPSHIRE        | Baseload, Peaking                           | Awareness         |   |
| NEW JERSEY           | Baseload, Peaking                           | Operational       | Bid evaluation                          |
| NEW MEXICO           | Neither                                     | None              |   |
| NEW YORK             | Baseload, Peaking                           | Operational       | Bid evaluation                          |
| NORTH CAROLINA       | Peaking                                     | None              |   |
| NORTH DAKOTA         | Peaking                                     | None              |   |
| OHIO                 | Baseload, Peaking                           | Operational       | Qualitative                             |
| OKLAHOMA             | Neither                                     | None              |   |
| OREGON               | Baseload, Peaking                           | Operational       | Quantitative: resource planning         |
| PENNSYLVANIA         | Peaking                                     | Operational       | Qualitative                             |
| RHODE ISLAND         | Baseload, Peaking                           | Developing        |   |
| SOUTH CAROLINA       | Peaking                                     | Awareness         |   |
| SOUTH DAKOTA         | Baseload, Peaking                           | None              |   |
| TENNESSEE            |   | Does not regulate |   |
| TEXAS                | Neither                                     | Operational       | Qualitative:                            |
| UTAH                 | Neither                                     | Awareness         |   |
| VERMONT              | Baseload, Peaking                           | Operational       | 15% adder                               |
| VIRGINIA             | Baseload, Peaking                           | Developing        |   |
| WASHINGTON           | Baseload                                    | Awareness         |   |
| WEST VIRGINIA        | Baseload, Peaking                           | None              |   |
| WISCONSIN            | Peaking                                     | Operational       | 15% adder, quantitative                 |
| WYOMING              | Neither                                     | Awareness         |   |

proach. NPPC is a regional energy planning body which was created by the Pacific Northwest Electric Power Planning and Conservation Act.<sup>6</sup> The Council has a unique role in Northwest power planning, having a statutory requirement to develop a regional least-cost plan that considers environmental quality and includes a methodology for determining quantifiable environmental costs and benefits. The plan applies to Bonneville Power Administration resource acquisitions and may be influential with state agencies having siting authority in the region.

**B**y law, NPPC applies a 10% credit to conservation resources over traditional supply resources in its approach to resource planning. For example, if avoided costs are 5 cents/kWh, all conservation that costs less than 5.5 cents/kWh is considered economic.<sup>7</sup>

**Wisconsin's** Advanced Plan filing requires each utility to credit non-combustion technologies because of the impact of reduced air pollution. Non-fossil supply technologies and demand-side resources can cost 15% more than a combustion source and still be considered comparable in terms of overall societal costs.<sup>8</sup>

**The Vermont Public Service Board** ruled in April 1990 that utilities should discount demand-side resource costs by ten percent to reflect the "comparative risk and flexibility" advantages of such resources and that supply-side resources will be increased initially by five percent "to capture costs not already included in

the monetized prices of supply sources."<sup>9</sup> The April order also initiates a rulemaking proceeding to further define "adders to represent the cost of environmental externalities."

**3. Direct Quantification.** Methods that involve direct quantification of externality costs as part of resource planning and/or acquisition processes are increasingly being adopted by states. A num-

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*In California, both the siting and planning agency and the regulatory agency are developing externality rules.*

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ber of utilities have implemented bidding systems in which environmental impacts of a bidder's project are evaluated explicitly in a weighting or point scheme. Examples of direct quantification approaches include:

**California.** Both the California Public Utility Commission (CPUC) and the California Energy Commission (CEC) currently have proceedings in which the treatment and quantification of environmental impacts are being considered.

As part of its long-term resource planning function, the CEC issues a biennial Electricity Report. For the 1990 Electricity Report (ER

90), the CEC staff has proposed that the dollar values of air pollution impacts be reflected in the CEC's resource plan. The estimates would reflect the value of cutting emissions beyond that required under emission limits and is motivated in large part by air quality problems in the South Coast Air Quality Management District (SCAQMD). The dollar value placed on emissions would be based on the cost of control in the SCAQMD's Tier 1 efforts and represents average costs for a selected group of controls that offer major emission reductions.<sup>10</sup>

The CEC staff position is being examined and reviewed by utilities and others in hearings and workshops; ultimately, the CEC will adopt its recommended approach in the final Electricity Report.

**I**t is unclear how incorporation of these values into the CEC's forecast would ultimately affect which resources are built in California, because the CPUC's bidding process is relatively independent of CEC's approach.<sup>11</sup>

In parallel with the CEC's efforts, the CPUC is considering how to quantify and incorporate environmental impacts into the CPUC's existing Standard Offer #4 pricing methodology and bidding protocol for Qualified Facilities.<sup>12</sup> The CPUC held workshops on this topic in February-May 1990 and received comments from interested parties. The CPUC is considering using an adder to incorporate environmental concerns into electric resource planning and acquisition pro-

cesses. Adders are payments in addition to the price paid for power to all winning bidders in the CPUC's bidding system, which uses a "second-price" auction.<sup>13</sup>

Oregon's PUC, unlike California's, puts major responsibility on the utilities for developing environmental externality costs. In its April 1989 least-cost planning order, the Public Utility Commission required that external costs be considered in the cost-effectiveness evaluation of resource options and that both qualitative and quantitative approaches should be employed.<sup>14</sup> Since external costs are uncertain and subjective in many cases, the utilities are required to present these costs separately from conventional accounting costs and to give a range of expected values. The process is designed to be flexible and open to review.

Pacific Power and Light (PP&L) was the first utility to file a long-term integrated resource plan under the new order. PP&L's plan addressed environmental externalities in the following fashion: (1) the company included a scenario in its sensitivity analysis in which CO<sub>2</sub> emissions from PP&L's existing and new generating facilities would be reduced by 20% from 1988 levels by the year 2005. Under this scenario, the utility found that it made sense to promote repowering of existing facilities and acquire more renewable resources compared to the basecase, and; (2) as a check on the robustness of the relative ranking of resources

in individual scenarios, PP&L added a combustion tax of 10 mills/kWh to the cost of fossil-fired resources and then analyzed the resulting mix of resources.

Wisconsin's PSC has directed the state's utilities to develop integrated resource plans which reduce SO<sub>2</sub> by 50% of 1980 levels by 1993 and which anticipate significant emission reductions for carbon dioxide (e.g., 20% by the year 2000). In addition, the PSC has re-

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*Some states, like Oregon, put the burden on utilities to come up with an approach to externalities.*

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quired that Wisconsin utilities include in their planning processes a "NEEDS" factor, which includes external environmental, social, and political costs that are "Not Easily Expressed in Dollars."

New York's Public Service Commission has been overseeing the development of bidding programs to acquire new resources by the state's seven investor-owned utilities. Environmental impacts are explicitly included among the factors considered in selected winning bids. The Commission's order establishing guidelines for utility bidding programs articulated two key principles relating to environmental fac-

tors: (1) all permissible projects are not environmentally equal and thus environmentally inferior projects should be penalized appropriately; and (2) the weights for environmental factors relative to each other and relative to other non-environmental factors (e.g., price) should be based on the costs of mitigating the environmental impacts. Based on Commission staff analysis, the most environmentally disruptive source, under the most unfavorable circumstances, is assigned an environmental cost of 1.405 cents/kWh, which is about 24% of the utility's avoided cost. All other resources are assigned some fraction of that total, depending on their environmental point score.<sup>15</sup> This scheme assigns point values to different levels of air and water emissions and land degradation. (See Putta, page 42) of this issue, for a more detailed description of New York's approach.)

New Jersey utilities are implementing integrated resource bidding programs based on a settlement agreement between utilities, QF representatives, and Board of Public Utilities staff. There are three categories in the bidding process: economic issues (maximum of 55%), non-economic issues (minimum of 20%), and project viability (minimum of 25%). Non-economic issues include environmental issues and fuel efficiency. Environmental factors and energy efficiency were each weighted at one percent of the total bidding points by Public Service Electric & Gas Company in

its recent solicitation. Jersey Central Power & Light Co.'s June 1989 RFP contained a weighting of up to 2% for reduced NO<sub>x</sub> emissions and up to 4% for higher levels of fuel efficiency.

Colorado's PUC has included environmental and economic externalities in Colorado's QF bidding process. In 1988, the PUC approved biennial QF bidding for up to 20% of each utility's demand forecast. Bidding is done on a 100 point scale. Zero to 12 points are given for fuel type (see Table 3). The fuel type points include environmental and economic externalities. Renewables are given an additional five point bonus at the end of the bidding process.<sup>16</sup> The bidding process has not yet been implemented because there is currently excess capacity; no QF bids are expected until the mid-1990s.

The Northwest Power Planning Council staff, in developing the Council's 1990 Power Plan, recently prepared an issue paper which reviews environmental pollutants associated with various resource types and their major effects on the environment.<sup>17</sup>

### B. Incorporation of Externalities in Ratemaking

PUCs and utilities in a number of states are developing ratemaking mechanisms that encourage utility DSM programs in order to overcome barriers posed by traditional regulation. Several states have increased their authorized rate of return for demand-side management and make explicit reference to environmental exter-

nalities as the *principal* rationale for inclusion of utility incentives for DSM (see Table 2). For example, Connecticut allows up to an extra 5% rate of return and Kansas allows an extra 0.5-2.0% rate of return. In Idaho, the PUC can give an unspecified higher rate of return to utilities that have dem-



onstrated "aggressive" conservation programs.

### III. Discussion and Conclusions

Our survey of state efforts to consider environmental externalities is subject to a number of important caveats.

First, the survey relied almost exclusively on PUC staff and commissioners, and did not include other state agencies that may play

a role in utility-related environmental considerations. PUC activities to incorporate environmental considerations in resource planning do not exhaust a given state's efforts to deal with these issues. PUC activities are affected by each commission's authority, legislation, as well as other state legislation that addresses environmental review processes or major environmental issues (e.g., acid rain deposition).

Second, this study could be broadened by more in-depth case study analysis of leading states that have developed approaches to incorporate environmental externalities in resource planning and acquisition; Ottiger et al.,<sup>18</sup> performed such an analysis for five states.

Third, accurate assessments of PUC policies in the area of environmental externalities may be difficult to discern from the statements of one or at most a few individuals, particularly in large commissions. Moreover, respondents may not be aware of all relevant work within their PUC or may not share a common vocabulary in characterizing certain practices.

For all these reasons, this survey should be viewed as a "snapshot" of regulatory developments among state PUCs in an area that is evolving rapidly.

The survey portrays very clearly that environmental considerations are quickly assuming increased prominence in electric utility resource planning, generally at the insistence of state regulators and legislatures.

TABLE 3: Colorado QF Bidding, Fuel Type Credits

| Fuel Type   | Points |
|-------------|--------|
| Renewables  | 12     |
| Coal        | 5      |
| Natural Gas | 2      |
| Oil         | 1      |

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continued from page 30

Ultimately, while electric utilities and others may raise questions about the role and responsibility of state PUCs to address environmental externalities—given the roles of federal and state government agencies directly charged to deal with environmental quality—it appears likely the state regulatory thrust to more adequately address environmental factors in planning will continue.

State approaches can be expected to vary rapidly in response to this fast-changing environment and public reaction. ■

#### Footnotes:

1. See generally, D. ZIMMERMAN, W. TAX, M. SMITH, J. DEMMY, AND R. BATTYE, ANTHROPOGENIC EMISSIONS DATA FOR THE 1985 NAPAP INVENTORY (U.S. Environmental Protection Agency, EPA-600/7-88-022, Nov. 1988); see also NAT'L ACID PRECIP. ASSESSM'T PROG. (NAPAP), INTERIM ASSESSMENT, Vol. I (1987).
2. The survey was conducted in three phases. First, telephone interviews were conducted based on a list of PUC contacts provided by NARUC's Energy Conservation Committee. Forty-nine PUCs were contacted through this process. Second, the results of these interviews were summarized under four general headings and the written results were sent to the respondents for confirmation, expansion and correction. We received responses to the written summaries from 35 PUCs. In the third phase, we mailed the compiled state information to the PUC chairman in each state. Twenty state PUCs responded with further changes to the summary of activity in their state. Written summaries for each PUC are presented in Cohen et al. See S. COHEN, J. ETO, C. A. GOLDMAN, J. BELDOCK AND G. CRANDALL, A SUR-

VEY OF STATE PUC ACTIVITIES TO INCORPORATE ENVIRONMENTAL EXTERNALITIES INTO ELECTRIC UTILITY PLANNING AND REGULATION (Lawrence Berkeley Laboratory, LBL-28616, May 1990).

Based on analysis of responses from individual PUCs, we grouped PUC activities in this area into four general categories (see Table 1, page 25). These categories provide a relative index of the current status of state ef-



orts to consider environmental externalities in resource planning and selection. However, they should be interpreted with caution, given the limitations of the survey and the rapid changes currently underway in a number of states.

3. We did not categorize the status of PUCs efforts in Nebraska and Tennessee. In Nebraska, all power generation is publicly owned and not under the jurisdiction of the PUC. In Tennessee, the vast majority of power is generated by the federal Tennessee Valley Authority.
4. Nevada Senate Bill No. 497 (July 1989).
5. J. KOOMEY, COMPARATIVE ANALYSIS OF MONETARY ESTIMATES OF EXTERNAL COSTS ASSOCIATED WITH COMBUSTION OF FOSSIL FUELS, Lawrence Berkeley Laboratory (LBL-28313), Mar. 1990.
6. Pacific Northwest Electric Power Planning and Conservation Act, 16

U.S.C. secs. 839 et. seq (1980).

7. Northwest Power Planning Council, Accounting for the Environmental Consequences of Electricity Resources During the Power Planning Process, Issue Paper 89-7, Apr. 17, 1989. See 16 U.S.C. sec. 839a (4)(A) for the 10% advantage required in the cost-effectiveness definition.
8. Wis. Pub. Serv. Comm., Findings of Fact, Conclusion of Law and Order, Advance Plan 5, Docket 05-EP-5, Apr. 6, 1989.
9. Vt. Pub. Serv. Bd., Least Cost Investments, Energy Efficiency, Conservation and Management of Demand for Energy, Docket #5270, Apr. 1990.
10. Cal. Energy Comm., Valuing Emission Reductions for Electricity Report 90, Staff Issue Paper #3R, Docket #88-ER-8, Nov. 1989.
11. Cal. Pub. Util. Comm., Workshop Report: Incorporating Environmental Adders Into the Biennial Plan Update Proceeding, OII.89-04-007, Apr. 13, 1990.
12. Cal. Legis., Joint Committee on Energy Regulation and the Environment, Electric Resources and Environmental Impacts: Draft Phase I Report, prepared by C.R. Roach, E.P. Kahn and D.L. Modisette, Apr. 1990.
13. See Cal. Pub. Util. Comm., Decis. No. D.87-05-060 (May 1987).
14. Or. Pub. Util. Comm., Order No. 89-507, Apr. 1989.
15. N. Y. Pub. Serv. Comm., Opinion and Order Establishing Guidelines for Bidding Program, Opinion 89-7, Apr. 12, 1989.
16. Colo. Pub. Util. Comm., Decis. No. C88-726, Appl. No. 3887, June 9, 1988.
17. Northwest Power Planning Council, New Resources: Supply Curves and Environmental Effects, Staff Issue Paper, 90-1, Feb. 28, 1990.
18. R. Ottinger, et al., Environmental Costs of Electricity, (draft final report cited with permission), Pace U. Cent. for Envtl. Legal Studies, Feb. 1990.