

April 1991

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### Recommended Citation

Helmuth, John A.; Kent, Donald; and Lessard, Jeffrey P. (1991) "Capital Budgeting and State Approval of Power Plants," *Southern Business Review*. Vol. 17: Iss. 1, Article 4.

Available at: <https://digitalcommons.georgiasouthern.edu/sbr/vol17/iss1/4>

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# CAPITAL BUDGETING AND STATE APPROVAL OF POWER PLANTS

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## Introduction

Current issues in the electric power industry concerning excess capacity, escalating new plant capital costs, and the abandonment of plants that are under construction indicate that there is a greater need to understand the power plant construction approval procedures used by regulatory authorities. State approval procedures for plant investment are generally referred to as either Certificates of Convenience and Necessity or Certificates of Need. Approximately one-half of the states require prior approval before an electric utility can construct a generating plant. Howe and Rasmussen (1982) describe the procedures required by state regulatory agencies when applying for either the Certificates of Convenience and Necessity or Certificates of Need.

Earlier survey work by both Brigham and Pettway (1973) and Howe (1979) provides significant insight into electric utility capital budgeting procedures. This paper, in contrast, investigates the capital budgeting methods used for Certificates of Need by which the utilities gain approval for the construction of new power plants.

Our survey suggests that, on average, the state public utility commissions required that the utilities' capital budgeting techniques become increasingly more rigorous. For instance, in today's regulatory environment, it is much more common to analyze plant investments from many dimensions. These dimensions include the evaluation of plants of different scale, fuel type, and alternative technologies. However, net present value analysis was not applied in any of the hearings before state commissions. The lack of the use of net present value techniques not only can lead to a misallocation of resources, but can also impede progressive methods of allocating capital costs to ratepayers, which would require more sophisticated capital budgeting (Marcus, 1986).

## Literature Review

Brigham and Pettway (1973) provide the seminal work on electric utility capital budgeting. They surveyed 116 electric utilities and received a 46 percent response. Brigham and Pettway found that NVP methods were used for discretionary investment opportunities (e.g., cost savings, etc.). However, the vast majority of investment opportunities associated with the public utilities are mandatory, thus not discretionary in nature. Alternative capital budgeting methods (i.e., non-NPV techniques) are applied to these non-discretionary investment opportunities by the public utility commissions. The most common method of evaluation (69 percent of responses) was to

select the project with the lowest present value of annual costs. Ninety-four percent of the companies indicated that the present value least cost method is used to analyze some of their capital projects. Second, the cost of capital used for discounting to present value was overwhelmingly the current cost of capital rather than the embedded cost of capital. Third, sophisticated techniques were not used to evaluate risk. The methods used to evaluate risk generally incorporated either a sensitivity analysis or arbitrarily decreasing the expected life of a project. Finally, only 60 percent of the companies conducted post-audits of their capital budgeting decisions.

The Howe telephone survey of May 1978 included 51 privately owned electric utilities. Howe was primarily interested in the amount of resources devoted to the capital budgeting process. He found that the average capital budget was greater than \$200 million. Further, Howe found that, on average, more than twenty employees were engaged in the capital budgeting process. Nearly 67 percent of the capital budget was devoted to generation, and 50 percent of the staff's time was engaged in analyzing generation expenditures.

The above-mentioned two articles comprise the major work on electric utility capital budgeting practices. Incidental articles often have capital budgeting implications. For instance, Chao, Gilbert and Peck (1984) referred to a corporate strategy of "capital minimization" that has been adopted by utility executives. This strategy occurs when the rate of return allowed by the state is less than the utilities' cost of capital. Thus, the shareholder would be better off without the capital expenditure. The "capital minimization" strategy attempts to minimize the negative impact on the value of the shareholder's equity position if the allowable rate of return becomes lower than the utilities' cost of capital. Such a strategy appears as if "capital minimization" has as its basis the internal rate of return. Thus, Chao, Gilbert and Peck imply that utility executives are primarily concerned with shareholder wealth maximization.

In summary, because of the work by Brigham and Pettway, Howe, and Chao, Gilbert and Peck, we have a good idea of the capital budget procedures and the resources employed by the electric utilities. The next section of the paper includes an investigation of the capital budgeting techniques that are used before state utility commissions in gaining approval for new power plants.

### Survey Results

The plan for surveying state public service commissions (or designated regulatory bodies for Certificates of Need) was to investigate the extent to which rigorous capital budgeting procedures were followed in light of recent issues that face the utility industry. Accordingly, our survey addressed the following:

1. Does your state have a formal Certificates of Need procedure for new power plant investment?

2. What capital budgeting procedures are used by utilities in applying for Certificates of Need?
3. Are alternative capital projects analyzed for:
  - a. Different fuel sources?
  - b. Different scales of plant?
  - c. Purchased power (from other sources)?
  - d. Alternative technologies (solar, wind, etc.)?
4. Are the certification procedures different for peak load power plants as compared with base load power plants?
5. Does the state mandate the capital budgeting techniques that will be used in applying for certification?

Our sample consisted of twenty-five state public utility commissions, listed in Appendix A. Five states had no prior approval process or Certificates of Need procedure, and two states did not respond. Thus, our sample consists of eighteen of the approximately twenty-five states that have formal certification requirements.<sup>1</sup> The survey procedure was to first initiate the questionnaire over the telephone during Spring, 1989. This was practical since the survey process often required talking to several people per commission before we were directed to the individual supervising the Certificates of Need procedures. Second, after the telephone interview, a questionnaire was completed and then mailed to the designated individual so that he or she could make any corrections or amplifications to the initial answers. Additionally, we asked that the most recent certification case be mailed to us. The results presented herein are a compilation of this information.

A word of warning is advisable pertaining to the nature of the utility industry. Many states have not had new Certificates of Need applications for over ten years. This reflects the excess generating capacity of the 1980's. Thus, the certification procedures reported in some cases are aged. Furthermore, state trends are such that portions of cost overruns, especially those associated with nuclear plants, are not being admitted to the rate base. Some states, with no prior approval for plants, will add power plants to the rate base only on an ad hoc basis. Also, some states have indicated that they intend to review their certificates of need procedures. Thus, both the procedures we discuss and the industry environment are far from static.

### **Investment Criteria**

Exhibit 1 indicates that the most common capital budgeting criterion (77%) is the present value least cost method. This method results in the executive selecting investment opportunities that provide the least cost present value of annual costs. The present value least cost method of capital budgeting is also referred to, within the utility industry, as the present value revenue requirement.<sup>2</sup> In contrast to the present value least cost technique, one state employs a least cost approach with no associated present value analysis, and one state allows the use of any method that applies time value of money con-



cepts. No state employs the NPV approach to capital budgeting. Additionally, we inquired to the extent that payback, present value payback, average return, and internal rates of return were used in the capital budgeting process, and there was no such response.

### Exhibit 1 Investment Criteria

Method	Responses	Percentage
Present Value Least Cost	14	77.70%
Any Time Value of Money Method	1	5.55%
Least Cost	1	5.55%
Various*	2	11.11%

\*Indicates that no particular standard for capital budgeting is applied.

It is interesting to note that the most common capital budgeting technique identified by the Brigham and Pettway study was also the present value least cost method. Thus, sixteen years later, we still find the present value least cost method as the most commonly employed capital budgeting technique in use. Brigham and Pettway explained the static reasoning in adopting such a technique. They posited that if a utility accepted positive NPV projects, the utility believed that it would be penalized if the allowable rate of return decreased. Thus, the least cost method is adopted. Brigham and Pettway raised obvious exceptions to this reasoning from a dynamic setting and argued for the use of NPV analysis. It is surprising that, given the growing sophistication of rate of return hearings since 1973, capital budgeting techniques are still antiquated.

#### Comparison of Alternative Investments

Sixteen of the eighteen states responded that they required a comparison of different investment alternatives before granting Certificates of Need. Exhibit 2 indicates that the vast majority of state utility commissions investigated both different fuel types (e.g., coal vs. oil) and scale of plant. These two factors can be important in that they inhibit the ability of the utility to arbitrarily induce input substitutions that may not be efficient. Further, thirteen states considered the purchase of power as an alternative to capital construction. A surprisingly large number (nine) of utility commissions considered the evaluation of alternative technologies. The general impression is that, over time, there has been more rigor associated with the analysis of appropriate capital budgeting procedures, (i.e., looking at alternative investments). Further, some states have just begun to incorporate present value analysis in their capital budgeting decision making. The trend toward greater rigor in capital budgeting is accounted for by industry problems such as excess capacity and cost overruns for new plants.

**Exhibit 2**  
**Comparison of Alternative Investments**

Alternative Response	Yes	No	No
Fuel Type	15	0	1
Size	13	2	1
Alternative Technologies (Wind, Solar, etc.)	9	6	1
Conservation	4	11	1
Purchase Power	13	2	1

Finally, seventeen states indicated that they do not differentiate or change the certification procedure associated with a peak load plant versus a base load plant. However, several utility commissions indicated that if the capacity of the plant was extremely small, the certification procedure would be less rigorous. This could be an efficient use of resources on a marginal benefit-cost relationship. As far as the choice of the investment criteria, sixteen states indicated that they did not mandate the use of specific capital budgeting techniques but rather allowed the utility to present capital budgeting techniques of their own choosing. Also, external rate consultants provide much of the analysis. Most states, however, indicated that they reviewed, critiqued, and often asked for, additional analysis.

### Conclusions

This study included a survey of twenty-five state public service commissions with regard to their pre-approval certificate procedures for power plants. The overwhelming majority of states accept the present value least cost method of capital budgeting. This method was also dominant in the Brigham and Pettway (1973) survey of utilities. Further, state utility commissions do not mandate the capital budgeting techniques, but accept those methods provided by the utilities. No state neither required nor reported accepting the NPV analysis. The resulting inefficiencies in plant choice, and possible aggregation of such a misallocation at the industry level, can be excessive and may lead to new industry problems as the era of excess capacity in the 1980's is nearly over.

Our study did find, however, that there is a growing trend towards an increased rigor in the approval process. This can be seen in that most states now use some method of present value analysis. Further, there is now extensive analysis of alternative investments (i.e., extended evaluation by plant scale, type of fuel, alternative technologies and purchased power). The capital budgeting procedures currently employed are far from static and are likely to be greatly refined during the next round of power plant construction. It appears equally likely that there will be greater public attention to the front

end of the regulatory process given both the sheer magnitude of the public utilities' investment opportunities and the choice of nuclear versus alternative fuels. Moreover, some states, such as Massachusetts, have already debated the relative merit of the pre-approval certificates versus no pre-approval before public utility commissions.

### Appendix A States Included in the Survey

1. Arizona\*
2. California\*\*
3. Connecticut
4. Florida
5. Illinois
6. Indiana
7. Kansas
8. Kentucky
9. Louisiana
10. Maine
11. Massachusetts
12. Michigan\*
13. Minnesota
14. New Jersey
15. New York
16. North Carolina
17. Ohio
18. Oklahoma\*
19. Pennsylvania\*
20. South Carolina
21. Texas\*\*
22. Virginia
23. Washington\*
24. West Virginia
25. Wisconsin

\* States not requiring certificate

\*\* Information not received

#### Endnotes

<sup>1</sup>New York was reported as a certificates of need state. However, its law governing the certification process expired in 1988.

<sup>2</sup>See Brigham and Pettway (1973) for a more detailed explanation.

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