United States General Accounting Office

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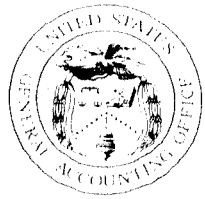
Report to the Chairman, Committee on Energy and Commerce, House of Representatives

May 1991

ELECTRICITY REGULATION

Issues Concerning the Hydroelectric Project Licensing Process



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United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-243119

May 10, 1991

The Honorable John D. Dingell
Chairman, Committee on Energy
and Commerce
House of Representatives

Dear Mr. Chairman:

In November 1989 and January 1990 letters, you requested that we examine (1) the Federal Energy Regulatory Commission's (FERC) review of the financial and economic feasibility of proposed hydroelectric projects during the agency's licensing process, (2) the extent of speculation on potential hydropower sites,[1] and (3) the possible need to amend section 13 of the Federal Power Act in order to allow licensees more time to arrange financing and commence construction of licensed projects.

Results in Brief

FERC's general methodology for analyzing the economic and financial feasibility of proposed hydroelectric projects employs standard techniques used for analyzing investment projects. FERC's analysis is not intended to guarantee that a project, if licensed, will prove to be economically or financially feasible. FERC's estimates of feasibility incorporate estimates of project construction costs, future operating costs, and alternative energy costs. Because of the inherent uncertainties associated with estimating costs and prices over the project's life (estimated at 50 years), FERC does not automatically deny licenses to all projects that appear uneconomic. Rather, according to FERC officials, license applicants are given the opportunity to demonstrate that their project can be financed in the market. Thus, some licensed projects fail to secure financing and are not constructed.

Determining the extent of speculation in hydropower development is difficult because there is no single accepted definition of the practice and there are legitimate reasons, such as changing economic conditions, why licensed projects may fail to be constructed. The Federal Power Act allows licensees an initial 2 years to commence construction and then allows FERC to grant one 2-year extension if requested by the licensee and warranted by circumstances. If construction has not begun within

[1]Speculation on hydropower licenses involves seeking a license for a hydropower site even though its development may not be financially feasible until some time in the future. Hydropower site developers might speculate in hopes of making a future profit.

those 4 years, the license is forfeited. According to FERC hydropower officials, this provision is intended to discourage speculative applications for licenses.

FERC data show that for hydroelectric licenses issued in fiscal years 1980 through 1985, about 93 percent of the 430 licensees began construction of their projects within 4 years of receiving the license.[2] Therefore, amending section 13 of the act to allow licensees additional time to begin construction does not appear necessary.

Background

Under the provisions of the Federal Power Act, nonfederal hydroelectric projects affecting the nation's navigable waterways require a license from FERC. Hydroelectric license applicants include electric utility companies, municipalities, and private developers.

In making licensing decisions, FERC must balance a number of factors to determine whether the proposed projects will serve the public interest. FERC estimates the economic and financial feasibility of projects in part to protect investors from potentially uneconomic projects. Over the years, the courts have confirmed FERC's responsibility to look at economic feasibility to protect the public.

The Electric Consumers Protection Act of 1986 amended the Federal Power Act to require that FERC not only consider the power and developmental purposes of hydroelectric projects, but also give "equal consideration" to nondevelopmental aspects. These nondevelopmental aspects must include conserving energy; protecting, mitigating damage to, and enhancing fish and wildlife, related spawning grounds, and habitat; protecting recreational opportunities; and preserving other aspects of environmental quality.

Review of Financial and Economic Feasibility

FERC's economic feasibility analysis is based on how a proposed project's estimated cost compares with estimates of alternative energy costs—that is, how the cost of electricity from the proposed project compares with the cost of the same quantity of electricity from some other source. After determining that a market for the electricity to be generated exists, FERC estimates the revenue that the project would produce over a

[2]FERC could not provide sufficient data to enable us to calculate this percentage for licenses issued prior to fiscal year 1980. Licenses issued after fiscal year 1985 are excluded because the 4-year period had not expired at the time of our analysis.

50-year period. FERC compares this revenue to the estimated cost of constructing and operating the project to estimate the project's net present value.

Net present value is a measure of the difference between a project's estimated revenues and costs over its useful life. In computing the net present value, FERC "discounts" the value of future revenues and costs to the present; that is, it estimates how much future dollar amounts are worth today. A positive net present value indicates that the project would be economical, while a negative net present value indicates that it would not be.

Financial feasibility refers to the likelihood that a project will generate returns sufficient to attract the necessary financing; it is assessed by comparing the project's estimated rate of return with the potential returns available from alternative investments with similar risks. A project's estimated rate of return is a measure of the estimated financial return on the investment in the project. For projects proposed by private developers, FERC uses a rate of return analysis to determine whether the project is financially feasible.

Rate of return analysis is used to supplement net present value results. Projects proposed by municipalities and private utilities are generally evaluated by net present value, since regulation of private utility rates and municipalities' ability to finance their projects with tax-free bonds gives the rate of return analysis a different meaning.

Appendix I provides additional information about FERC's procedures for reviewing proposed hydroelectric projects.

Speculative Applications for Hydroelectric Licenses

Speculation on potential hydroelectric sites, or "site banking," by license applicants is difficult to define and virtually impossible to measure. FERC officials noted that applying for a hydropower license is both time-consuming and costly; they consider the exercise of reserving hydropower sites for future development and profit unlikely.

FERC data show that from fiscal year 1980 to fiscal year 1985 the agency issued 430 hydroelectric licenses for new projects. Of these, 400, or about 93 percent, began project construction within 4 years of receiving a license. A relatively small remainder of licensed projects—about 7

percent—did not begin construction. These figures suggest that applications for licenses to "bank" sites in case future events render the site economically or financially feasible are not particularly widespread.

Need to Amend Section 13 of the Federal Power Act

Section 13 of the Federal Power Act established the 4-year limit for beginning construction of licensed hydropower sites. According to FERC officials, this time limit helps discourage speculation and encourage quick development of hydropower resources.

In recent years the sponsors of some licensed projects have sought special legislation allowing an extension—in addition to the original 4 years—of the time period to begin construction. In most cases, the licensees cited the need to complete "financial arrangements" as the reason additional time was required. Since 1981, licensees of nine projects have sought special legislation for time extensions; of these, six have been granted 2 additional years to commence construction.[3]

Given that the existing time period may help discourage potential speculative applications, and that relatively few licensees have sought special legislation, we believe an amendment to allow more time to begin construction is not warranted.

To respond to your request, we obtained and reviewed information from the Federal Energy Regulatory Commission's hydropower licensing staff concerning their general procedures for licensing hydroelectric power projects. We talked with license applications analysts and examined published documents on the agency's general methodology for assessing financial and economic feasibility of projects. Because our objective concerned FERC's overall methodology, we did not evaluate the accuracy of the data used, nor the assumptions or calculations used to estimate any specific project's net present value or rate of return.

To address the issues of speculation and possible revisions to the law, we reviewed the legislation and examined recent congressional hearings on FERC's activities. We also reviewed documents filed with FERC by two environmental groups—American Rivers and the National Wildlife Federation—as well as FERC's response, and met with officials of the two

[3]Licenses for the following projects have been granted 2-year extensions: Cowlitz Falls Project, White River Lock and Dam No. 1, White River Lock and Dam No. 2, White River Lock and Dam No. 3, Swamp Creek, and Ruth Creek.

groups. In addition, we obtained and analyzed FERC summary data on hydroelectric licensing activity from 1978 to 1990.

Our work was done between March and December 1990 in accordance with generally accepted government auditing standards. As you requested, we did not obtain official agency comments on a draft of this report, although we did describe our findings informally to FERC officials responsible for hydroelectric licensing. These officials agreed with our findings and comments.

As arranged with your office, we will make no further distribution of this report until 30 days from the date of this letter, unless you release its contents earlier. At that time, we will send copies to the Secretary of Energy; the Director, Office of Management and Budget; and other interested parties.

Major contributors to this report are listed in appendix II. If we can be of further assistance, please do not hesitate to contact me on (202) 275-7382.

Sincerely yours,

Victor S. Rezendes
Director, Energy Issues

Contents

Abbreviations

FERC	Federal Energy Regulatory Commission
GAO	General Accounting Office

FERC's Process for Reviewing Proposed Hydroelectric Projects

The Federal Energy Regulatory Commission (FERC) consists of five commissioners and several staff offices. The Office of Hydropower Licensing analyzes proposed hydroelectric projects and makes recommendations regarding final licensing decisions. The staff recommendation and the licensing decision are based on an evaluation of, and possible tradeoffs between, both economic and environmental aspects of proposed projects.

FERC's economic feasibility analysis is based on comparing a project's estimated cost with estimates of alternative energy costs. In essence, FERC first determines whether a market exists for the electricity to be generated and estimates the revenues that the project, if it replaced alternative sources of energy, would produce over a 50-year period. FERC also estimates the cost of constructing and operating the project over the 50-year period and applies a discount factor to discount the future revenues and costs to their present value. Comparing the present value of the revenues with the present value of the costs provides an estimate of the project's net present value.

If a project's estimated net present value is positive, the project is considered to be economic. A project for which the estimated net present value is small or negative is considered to be marginally uneconomic. For both economic and marginally uneconomic projects proposed by private developer applicants, FERC estimates rates of return to indicate whether the project could be financially feasible.

Financial feasibility refers to the likelihood that a project will generate returns sufficient to attract the necessary financing; it is assessed by comparing the project's estimated rate of return with the potential returns available from alternative investments with similar risks. (FERC does not generally perform this analysis for projects proposed by municipalities and private utility companies. In these cases, the rate of return analysis does not have the same meaning because rates charged by private utilities are regulated and municipalities finance their projects with tax-free bonds.) FERC uses rate of return analysis for projects, including those with negative net present values, because applicants should still have the opportunity to demonstrate the financial feasibility of their proposed projects.

FERC does not determine that a proposed project is financially feasible based on a specific minimum rate of return. Instead, the agency determines whether a proposed project's estimated return falls within a range that is likely to attract financing. Projects with an estimated rate

of return below this range are generally dismissed as infeasible, while projects with an estimated rate of return within this range are generally recommended for licensing. However, some projects fall into a "questionable" range. According to FERC hydroelectric licensing officials, there is a spread of about 5 to 5.5 percentage points between the estimated rate of return of projects that are dismissed and those that are considered to be attractive investments and very likely to be financed. Projects within this range are generally recommended for licensing, even though their rates of return may not be high enough to attract potential investors.

FERC's decision to employ a range of acceptable rates of return is in part due to its belief that the financial calculations needed to estimate rate of return are very uncertain, and that applicants should be given the opportunity to demonstrate the financial feasibility of their projects. Rather than deny a license solely because the proposed project might fail to attract financing, FERC may license the proposed project and allow the market to decide whether or not it is financed and constructed. Accordingly, a small number of licensed projects are not built.

Environmental mitigation and enhancement measures can add to a proposed project's cost, and FERC cannot always be certain of the exact mitigation and enhancement measures that will be required of a licensed project. Therefore, FERC may estimate a project's rate of return under several alternative scenarios for environmental mitigation and enhancement.

FERC's financial and economic calculations are based on the same data base. License applicants are the primary source of data FERC uses in its estimates. FERC does not independently verify all data elements provided by hydropower applicants in their license applications; according to FERC officials, existing staff and funds are not sufficient to validate each data element submitted for each proposed hydropower project. FERC does, however, closely examine applicants' cost and revenue estimates and makes adjustments where they appear warranted. For example, in assessing future energy consumption rates and prices FERC uses data compiled by the Department of Energy's Information Administration. FERC also uses water flow data compiled by the U.S. Geological Survey (the amount of water available to flow through the hydropower generators affects the amount of electricity the project will be able to produce, and thus its potential revenues).

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Related GAO Products

Energy Reports and Testimony: 1990 (GAO/RCED-91-84, Jan. 1991).

Energy: Bibliography of GAO Documents January 1986-December 1989 (GAO/RCED-90-179, Jan. 1990).

Energy Regulation: Enforcement of Requirements Imposed on Hydropower Projects Needs Strengthening (GAO/RCED-88-60, Mar. 1988).

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