

APPENDIX M
ECONOMIC ANALYSIS GUIDANCE

It is not intended that a Major Rehabilitation Evaluation Report be prepared for each rewind project. The level of detail should be commensurate with the complexity of the project. The analysis should draw on the basic framework outlined in the current "Guidance for Major Rehabilitation Projects."

M-1. **General.** Economic evaluations for rewind letter reports should be conducted in accordance with the analytic requirements for Major Rehabilitation Evaluation Reports (see ER 1130-2-500, Chapter 3). This methodology combines estimated equipment reliability, the probability of unsatisfactory performance (failure), and the physical and economic consequences of failure, in computing the life cycle costs of the alternatives being considered. While major rehabilitation proposals may be expensive and require significant analysis to support a recommendation, generator rewrites are limited in scope and cost. Therefore, the analysis to support rewind recommendations, should be limited.

M-2. **Requirements.** For a forced rewind (see Chapter 6 of ER 1130-2-510, Hydroelectric Power Operations and Maintenance Policies), the letter of support from the Power Marketing Agency, is sufficient justification for the proposed action and an economic analysis is not needed. For all other rewind proposals, the economic rewind study requirements are listed below.

a. **Development of the Base Condition.** The base condition is the alternative to which all other plans will be measured against. The following items should be considered in the development of the base condition.

(1) Assume that the project will be operated in the most efficient manner possible in the absence of the proposed rewind. If the project benefit stream is interrupted due to unsatisfactory feature (generator) performance, assume that funds will be made available to fix the feature.

(2) The timing, frequency and physical consequences of system disruptions are all unknown and must be estimated. The costs and durations of prior failures is important and useful information in estimating economic consequences and in establishing a pattern of failures. This information should be available from the Hydroelectric Design Center and District Operations personnel.

(3) Assumptions should be reasonable and clearly stated. Rely on available data where possible.

(4) The potential for minor failures (a repairable outage of short duration) should be considered in addition to failures that require a full generator rewind.

(5) The units use and availability must be considered relative to other units at the specific project. Plant factors and operational characteristics (peaking versus base load) will impact the economic value of replacement.

b. **Alternatives.** Only a limited number of alternatives need to be addressed for rewind letter reports. Alternatives (3) and (4) have very limited application.

(1) Rewind In-Kind. This alternative consists of a scheduled acquisition and installation of a new generator winding.

(2) Rewind with Uprate. For reports where uprating of the winding is being considered (i.e. a non-incident increase in the nameplate capacity) the analysis must demonstrate that the additional benefits of the uprate exceed the additional costs (incremental justification).

(3) Purchase Spare winding. In this alternative, a spare winding is acquired. Installation of the winding occurs only when the unit fails and can no longer be repaired. This alternative limits expenditures in the budget year, and minimizes unit outage time when failure occurs, and unit rewind is required.

(4) Combinations. If more than one unit at a plant is being considered for rewind, combinations of rewinds and spares should be evaluated.

(5) Exclusions. While the following alternatives are considered in Major Rehabilitation Reports, they do not need to be evaluated for rewind letter reports.

(a) Increased Maintenance. In most cases, increased or more frequent maintenance of generator windings will not extend the useful life and need not be considered as an alternative.

(b) Optimal Timing for Implementation. Optimization of implementation timing does not need to be addressed; only the budget year(s) under consideration need to be evaluated.

c. NED Values. Lost hydropower production due to Scheduled and unscheduled outages should be evaluated using NED-based economic losses (not revenues). Lost energy production, should, therefore, be evaluated as the avoided cost of generation using a system production cost model such as PWRSYM or PC-SAM. The report should explain how such losses have been estimated and the methodology and model(s) employed to determine NED-based unit values of energy and capacity.

M-3. Short Cuts/Expedited Processes. The purpose of the economic analysis is to assist in providing sufficient justification to support a rewind action. If recent reports and analyses have been completed for the specific project which would support the recommended rewind action, then these findings may be summarized in lieu of conducting a new economic analysis. Assumptions and calculations must be clearly described and the hydropower values cited must no more than 3 Fiscal Years old from the date of the proposed rewind report submission. For example, if a prior report used hydropower values that were developed at October 1992 price levels (FY 1993), then they would be acceptable for a rewind report being submitted during FY 1996. If the values were developed before FY 1993, then they could not be used for a FY 1996 rewind report submission.

M-4. Analytic Tools and Technical Assistance. Several economic models, consistent with major rehabilitation evaluation criteria, have been developed for rewind studies. Technical assistance in conducting the economic analysis or in utilizing an existing model may be obtained through CENPD-HDC or CECW-IWR-T.