Should we build more large dams? The actual costs of hydropower megaproject development ☆

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Highlights

- We investigate *ex post* outcomes of schedule and cost estimates of hydropower dams.

- We use the "outside view" based on Kahneman and Tversky's research in psychology.

- Estimates are systematically and severely biased below actual values.

- Projects that take longer have greater cost overruns; bigger projects take longer.

- Uplift required to de-bias systematic cost underestimation for large dams is +99%.

Abstract

A brisk building boom of hydropower mega-dams is underway from China to Brazil. Whether benefits of new dams will outweigh costs remains unresolved despite contentious debates. We investigate this question with the "outside view" or "reference class forecasting" based on literature on decision-making under uncertainty in psychology. We find overwhelming evidence that budgets are systematically biased below actual costs of large hydropower dams—excluding inflation, substantial debt servicing, environmental, and social costs. Using the largest and most reliable reference data of its kind and multilevel statistical techniques applied to large dams for the first time, we were successful in fitting parsimonious models to predict cost and schedule overruns. The outside view suggests that in most countries large hydropower dams will be too costly in absolute terms and take too long to build to deliver a positive risk-adjusted return unless suitable risk management measures outlined in this paper can be affordably provided. Policymakers, particularly in developing countries, are advised to prefer agile energy alternatives that can be built over shorter time horizons to energy megaprojects.

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