

Project Financing of New Hydropower Development at Existing Non-Powered Dams

Lessons learned from case studies in the past 10 years and suggestions for improving future hydropower economics

Abstract

The United States has a large untapped market opportunity in financing new hydropower development at existing non-powered dams (NPDs). The nation has over 80,000 dams that were built exclusively for non-energy purposes and currently lack hydropower-generating equipment. Retrofitting existing dam infrastructure can build additional capacity for non-intermittent renewable hydropower to communities with high-energy demand. Many of the fixed capital costs and environmental impacts of construction have already been incurred, thus reducing the technological and business risks associated with new dam construction. Yet, investors are still hesitant to finance NPD electrification projects due to a lack of financial literature on project valuation and economics, a lengthy and complex regulatory process that leads to project uncertainty, and minimal state and federal support to stimulate development and financing.

In this paper, we provide a review of project financing trends, development patterns, market drivers, and financing challenges facing NPD electrification. These findings are summarized across case studies of fifteen NPD hydropower retrofit projects over the past 10 years. The size, location, development strategy, project developer(s), and power purchase agreement determined whether the projects could secure financing through private equity, public or private debt, commercial lending, grants, or a combination of the available funding options. These projects all faced similar challenges in terms of regulatory complexities and indeterminate development timelines yet powered through those hurdles to realize the financial, economic and environmental benefits of hydropower to their communities.

This paper recommends developers to pursue the following strategies to improve future NPD project economics: (i) cluster small projects into a single portfolio to achieve economies of scale and improve bankability for low-cost financing, (ii) strategically position these portfolios in locations near potential off-takers and consumers with ambitious renewable energy mandates and (iii) disclose investment details in the form of financial literature to increase investor awareness of this traditionally underserved sector. The paper also recommends the federal and local government to promote NPD project financing by adopting policies that (i) focus on modernizing and streamlining licensing and permitting processes, (ii) expand/extend current tax credits on renewable energy development, (iii) invest in modernizing current infrastructure, (iv) preserve tax-advantaged and subsidized infrastructure financial instruments, and (v) introduce green banks to add depth to existing green project financing markets.

By executing these recommendations and capitalizing on recent NPD interest from institutional and retail investors in the public debt markets as well as infrastructure investment firms such as Brookfield Renewables and Climate Adaptive Infrastructure, project financing for NPDs can eventually become inexpensive, expeditious and commonplace across the nation.