Calculating the albedo-climate penalty of hydropower dammed reservoirs

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Prior studies have shown that hydroelectric reservoirs are typically darker than the surrounding land; thus, building a dam results in the creation of a reservoir that absorbs more heat than the land. And that heat slowly seeps into the atmosphere, contributing to global warming. In this new effort, the researchers surveyed 724 major hydropower stations around the world to see how much more heat they were releasing into the environment than would have been the case had the dams supporting them not been built. They then calculated how long it would take them to overcome the albedo-climate penalty, and thus to see a climate benefit.

The researchers found that almost half of the reservoirs they surveyed took just four years to reach a net climate benefit. Unfortunately, they also found that 19% of those surveyed took more than 40 years to do so, and approximately 12% of them took 80 years—the average lifetime of a hydroelectric plant.

The researchers suggest that changes to hydroelectric reservoirs are required to reduce the albedo penalty.


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