Letters

Water or Nuclear Power: Which Costs Less?

I would like to amplify one important point in Carter's article ("Grand Canyon dams: Interior to ask, 'Are they necessary?'" 7 Oct., p. 134). It is true that steam plants (probably nuclear) would prove more profitable than new hydropower dams for the Bureau of Reclamation's "basin account." But it does not follow that it is necessary to build steam plants, if the dams are not built, in order to finance the water supply projects.

A careful analysis of the figures presented by the Bureau to justify the need for the dams proves instead that the dams do not serve a significant financing function. The surplus revenue from the proposed dams is only $3.5 million per year over the 50-year payout period, assuming the Bureau's optimistic revenue estimates, based on the sale of power at 6 mills per kilowatt-hour, are correct. Furthermore, (i) there has been a 10 percent increase in the cost index for heavy construction since the Bureau prepared its cost estimates (in 1963) and (ii) the Bureau has said that an afterbay dam below Marble Dam will be needed to even out the flows in the river through Grand Canyon National Park, and the approximate cost of this dam, $36 million, has not been included in the project costs. The same is true of cash payments of $16 million to the Hualapai Indians, plus the cost of a second road to the reservoir site. If these extra costs are included, the proposed dams not only fail to contribute money to the basin account, but will actually have to receive money from the account to pay off their investment.

All of this is quite apart from the hidden subsidy provided from the U. S. Treasury in the form of interest-free and low-interest money.

If this is true, how is the Bureau able to calculate a basin account surplus of about $900 million at the end of the 50-year period? The trick is that surplus revenue from the existing Hoover, Parker, and Davis dams (all located on the lower Colorado) are put into the basin account, starting at the end of the payout periods for those dams. These funds are then used to rapidly reduce the interest-bearing investment in the new dams. The result is to greatly exaggerate the importance of the new dams and to disguise the vital role of the existing dams. Actually, the amount of the basin account at the end of the 50-year period without the new dams would be not appreciably different from the amount with the new dams.

These comments have a significance beyond the question of dams in the Grand Canyon. We are witnessing a historic change in the traditional relationship between water and power. In the past, power from dams could be used to finance water supply projects because the market value of that power exceeded the cost of generating and delivering it. Only in certain exceptional cases can this essential precondition now be met. The prior commitment of many of the most desirable hydropower sites, the gradual increase in the costs of heavy construction, and the imminent large-scale introduction of low-cost nuclear power have accomplished this reversal.

In the 19-month period beginning in February 1965, 32 nuclear reactor power plants with a total generating capacity of 23,707 megawatts were ordered. This is more than ten times the capacity of the proposed dams. The at-plant cost of power from most of these plants will range from about 3.5 to 4.0 mills per kilowatt-hour under conditions of financing by private utilities (with typical capital charges of 12 percent) to less than 2.4 mills with financing by public agencies such as TVA. Since the cost of nuclear plants is relatively independent of location, they can be better situated with respect to load centers than hydropower dams can, and transmission costs will be very much less.

Nuclear plants are generally not now being used to meet peaking power requirements, for reasons of overall utility system optimization. The new nuclear plants have the lowest operating costs of any plants on the system. As power demand drops during the day, the utility chooses to shut down first the plants with the highest operating costs.

There is no technical reason why nuclear plants cannot be operated to meet the same peaking power requirements as hydropower dams are at present designed to meet. A moment's reflection on the operation of nuclear reactors in submarines should dispel any doubts. Twenty years from now, when a large fraction of installed capacity will be nuclear, in all probability some of the nuclear plants (the older, less efficient ones) will be so operated.

At the same time that the value of power has been decreasing, the recognized value of water has been increasing. Hopefully, this will lead to an end to one of the Bureau's absurd practices. I refer to the assigning of zero value, in their benefit-cost studies, to water lost by evaporation (above what would normally be lost from the undammed river) from reservoirs behind hydropower dams. This is far from an academic point. To take one example: If the water evaporated from Lake Mead (behind Hoover Dam) is valued at $30 per acre-foot (1233.5 m^3), which is less than the estimated cost of Feather River water delivered to Southern California, then the value of this lost water is several times the present gross revenue from Hoover Dam power sales. The additional water made available could be delivered with no additional capital investment by existing aqueducts in California. As matters now stand, the aqueducts will be used at only partial capacity, since the other Colorado basin states plan to take a greater fraction than they are now taking of their allotted shares of water from the river.

Present Bureau benefit-cost practices ignore many of the more important improvements suggested by economists over the last decade. A review of the financing of water supply projects is overdue. I wish the Department of the Interior the best of luck as it penetrates the Alice-in-Wonderland world of Bureau economics. I hope they plan to take along a few of McNamara's whiz kids to help them chart the course in some of bureaucracy's murkiest waters.

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