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# Western Hydropower: Changing Values/New Visions

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# **Western Hydropower**

Changing Values/New Visions

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***Bruce C. Driver***  
*Attorney and Consultant*

*With Assistance From*

***Gregg Eisenberg***

*Boulder, Colorado*

**Report to the Western Water  
Policy Review Advisory Commission**

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Report to the Western Water  
Policy Review Advisory Commission

*August 1997*

## The Western Water Policy Review Advisory Commission

Under the Western Water Policy Review Act of 1992 (P.L. 102-575, Title XXX), Congress directed the President to undertake a comprehensive review of Federal activities in the 19 Western States that directly or indirectly affect the allocation and use of water resources, whether surface or subsurface, and to submit a report of findings to the congressional committees having jurisdiction over Federal Water Programs.

As directed by the statute, the President appointed the Western Water Policy Review Advisory Commission. The Commission was composed of 22 members, 10 appointed by the President, including the Secretary of the Interior and the Secretary of the Army, and 12 members of Congress serving *ex-officio* by virtue of being the chair or ranking minority member of the 6 congressional committees and subcommittees with jurisdiction over the appropriations and programs of water resources agencies. A complete roster is provided below.

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### This is an Independent Report to the Commission

The report published herein was prepared for the Commission as part of its information gathering activity. The views, conclusions, and recommendations are those of the author(s) and are not intended to represent the views of the Commission, the Administration, or Members of Congress serving on the Commission. Publication by the Commission does not imply endorsement of the author's findings or recommendations.

This report is published to share with the public the information and ideas gathered and considered by the Commission in its deliberations. The Commission's views, conclusions, and recommendations will be set forth in the Commission's own report.

*Additional copies of this publication may be obtained from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia, 22161; phone 703-487-4650.*

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## I. Introduction and Summary

In the 1973 report of the National Water Commission (NWC Report), more attention is given to exotic means of enhancing water supplies, such as icebergs, fog drip and transport of collapsible water-containing bladders than to hydroelectricity (hydro). The NWC Report does have a section on "power production," but it is about the use of water to cool thermal power plants and not at all about hydro. In short, hydro was the orphan child of water policy in the NWC Report.

The absence of analysis of hydro, western or otherwise, in the NWC Report seems strange today but is understandable. It likely derives from the fact that in 1973 the production of hydro did not seem to be causing any problems. Indeed, hydro may have seemed an unalloyed good, providing cheap, renewable power and standing ready to help western irrigators repay the cost of reclamation projects. Few apparently saw a need to address hydro for environmental or for any other reason.

Has the world changed enough since 1973 to warrant a closer look at western hydro? Without question, it has. First, electric-industry restructuring has placed hydro, like all power generation technologies, under the stress of competition. The question is whether hydro can survive in a world in which the power grid is open and in which the cost of power in the West has dropped precipitously to historic real lows. Second, there is a much better understanding—although far from perfect—of the role of hydropower production in damage to the aquatic environment. Can we mitigate hydro's damage to the environment at the same time that hydro is under financial pressure because of industry restructuring?

Third, there are forces in Washington, D.C. and elsewhere which favor "privatization" of federal hydro capacity. What are the likely impacts of privatization of federal hydro? What's the outlook for privatization in Congress? Fourth is a range of federal hydro repayment and subsidy issues that have more poignancy in an era of federal budget deficits and possible privatization. These issues make hydro a more compelling subject for analysis in 1997 than in 1973.

This paper<sup>1</sup> describes the West's hydro system and the major players involved in marketing hydro, discusses the major issues swirling around hydro and draws the principal conclusions that we believe this analysis suggests.

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<sup>1</sup> This paper has not been peer reviewed.

## II. The Facts

We begin with some key facts about the West's hydro resources.

### A. Overview

Total installed hydro capacity in the United States, according to the Federal Energy Regulatory Commission (FERC), is 73,494 megawatts, or roughly 10% of total national electric generation capacity.<sup>2</sup> (By comparison coal, is used in 40% of the nation's generation capacity.)<sup>3</sup> However, in the West, especially in the Pacific Northwest, hydro plays a larger role.

Table 1 sets forth the amount, in megawatts (MW), of installed hydro capacity by western water resource region.

Table 1.—Hydroelectric capacity in the West by water resource

Region	Number of plants	Installed capacity	Average plant size
Missouri River Basin	76	3,719	50
Arkansas-White-Red	31	1,966	63
Rio Grande	7	153	22
Upper Colorado	34	1,823	54
Lower Colorado	21	2,412	115
Great Basin	76	235	3
Pacific Northwest	314	31,998	102
California	410	9,162	22
Regional total	969	51,468	53
U.S. total	2,304	73,494	32
Region as percent of U.S. total	42%	70%	

Source: Hydroelectric Power Resources in the United States, FERC, 1992

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<sup>2</sup> "Hydroelectric Power Resources in the U.S.," Federal Energy Regulatory Commission, 1992.

<sup>3</sup> "Annual Energy Review, 1996," U.S. Energy Information Administration.

As table 1 shows, there are 51,468 megawatts of installed hydro capacity on western river basins. This is roughly 70% of national hydro capacity. And it amounts to about one-third of all installed electric generation capacity in the region, a substantially higher percentage than its share nationally. The higher percentage of hydro in the West is largely a result of hydro's dominant position in the Pacific Northwest where hydro comprises about 68% of all generation capacity.

Not only is the West the home of most of the nation's hydro capacity, it is also the home of 9 out of the 10 largest dams in the U.S. Table 2 lists the top ten dams by size and owner.

Table 2.—Ten largest hydroelectric plants in the U.S.

Plant	Owner/Operator	Size (MW)
Grand Coulee	BOR	6,180
Chief Joseph	BOR	2,457
John Day	BOR	2,160
R. Moses Niagara	PASNY	1,950
Hoover	BOR	1,935
The Dalles	COE	1,806
Glen Canyon	BOR	1,288**
Rocky Reach	Chelan County	1,260
Bonneville	COE	1,092
Boundary	Seattle	1,033

\*\* Before re-operation.

Source: Hydroelectric Power Resources of the U.S., FERC, 1992.

## B. Ownership of Hydro Facilities

It helps to explain the West's hydropower resource by reference to ownership because ownership determines the regulatory policies and political pressures



under which the capacity operates. In this regard, hydro facilities fall into two general groups—federal and non-federal—and, within those groups, into smaller categories.

Many think of the West as being almost the exclusive province of the large federal dams, like Hoover, Grand Coulee, Chief Joseph and Glen Canyon. Table 2 appears to support that viewpoint: All but one of the nine largest dams in the West are owned and operated by the federal government. Yet, surprisingly, federal dams comprise only about 55% of total hydro capacity in the West. Table 3 sets forth hydro facilities by owner and capacity in 11 western states.

Table 3.—Hydroelectric facilities in the West, by owner  
(In 1992, megawatts)

State	Federal	Municipal			Total	Percent of total
		Utility	PURPA	Other		
Montana	1,367	10	984	4	2,366	5
Idaho	833	156	1,044	209	2,241	5
Wyoming	257	3	1	0	260	1
Colorado	482	32	40	10	564	1
New Mexico	24	52	0	0	76	0
Arizona	2,443	90	7	0	2,540	5
Utah	155	52	50	1	258	1
Nevada	1,030	4	10	0	1,044	2
Washington	13,707	8,021	866	32	22,626	48
Oregon	3,945	224	1,082	16	5,268	11
California	2,068	3,942	3,761	131	9,902	21
Total	26,312	12,585	7,846	403	<sup>1</sup> 47,145	100
Percent of total	56	27	17	1	100	

<sup>1</sup> The total shown in this table is less than that shown in Table 1 because the water resource regions shown in that table contain more territory than the 11 states depicted in this table.  
Source: FERC Hydroelectric Resources of the U.S.

This table shows that, in California, federal hydro capacity is only 21% of total hydro capacity. Even in Washington, the home of the three largest hydro facilities in the U.S.—Grand Coulee, Chief Joseph and John Day—non-federal hydro capacity is about 40% of the total. Privately owned and municipal utilities have made heavy investments in hydro capacity in some western states, notably in the Pacific Northwest and California. In Idaho small non-utility facilities encouraged by the 1978 Public Utility Regulatory Policies Act (PURPA) comprise 10% of total capacity.

## 1. Federal Hydro

Federal hydro facilities in the West, while constructed and operated by the U.S. Bureau of Reclamation (BOR) and U.S. Army Corps of Engineers (COE), are best described with reference to the two federal power marketing administrations (PMAs) that market western federal hydropower: The Bonneville Power Administration (BPA) and the Western Area Power Administration (Western). BPA markets federal hydropower principally in the four PNW states (Oregon, Washington, Idaho and Montana). In the interior West, California, and the upper plains states, federal hydropower is marketed by Western. In Oklahoma and in portions of Kansas and Texas (as well as in Louisiana, Arkansas and Missouri), federal hydropower is marketed by the Southwestern Power Administration. Near the border with Mexico, two federal projects are operated by the International Boundary Water Commission, but the power from these projects is marketed by Western. In this report we focus on BPA and Western.

a. **Bonneville Power Administration.**—Created in 1937, BPA markets power to 193 customers<sup>4</sup> from 29 federal hydro plants<sup>5</sup> on the Columbia and Snake Rivers and their tributaries with a total capacity of close to 20,000 MW. From these resources, BPA provides about 40% of the PNW's firm power over high voltage power lines owned by the United States that represent more than 50% of the region's transmission capacity. Most of the energy is sold at wholesale to electric utilities. A small portion is sold directly to the region's aluminum companies.

Among the many statutory authorities that affect BPA's operations are individual reclamation project authorizations, the Bonneville Project Act, the Flood Control Act of 1944, the Pacific Northwest Electric Power Planning and

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<sup>4</sup> Most of BPA's utility customers are "preference power" customers, primarily public and private, non-profit cooperative entities and tribes who, by statute, are entitled to first call on the power from federal hydro plants.

<sup>5</sup> These dams are identified in Attachment A.

Conservation Act of 1978 (Regional Act) and the Endangered Species Act. Some key policies that are included in these enactments are:

1. Federal dams in the Upper Snake River in Idaho from which BPA markets hydropower were constructed primarily for the purpose of irrigation. Power is a secondary or incidental purpose. Most other Columbia River Basin facilities were constructed and are operated primarily to generate hydropower.
2. BPA is required to recover in power rates not only the capital, operating and maintenance costs of the hydro plants but also over \$500 million annually of defunct nuclear power plant costs incurred in the 1970s by the Washington Public Power Supply System (WPPSS).<sup>6</sup> For the next six years at least, BPA has also agreed to spend \$252 million annually for salmon recovery costs<sup>7</sup>.
3. BPA is a utility, like other utilities responsible for acquiring new resources to meet the loads of customers who choose to place their growing load requirements on BPA.
4. BPA's electric resource acquisitions as well as its investments in fish recovery, are subject to guidance (that favors energy efficiency, renewable resources and fish protection) by the Northwest Power Planning Council, a four state/eight member regional compact organization created in the 1978 Regional Act.
5. Municipal utilities, non-profit cooperative utilities, tribes and other public agencies are given a preference for the purchase of electricity from BPA.
6. Hydropower production by BOR and COE facilities is now understood to play a major role in the endangerment of salmon species in the region, encouraging pressure for change from federal and state agencies, the tribes, fishing interests and environmental organizations.

As explained in more detail in Section III, BPA is under financial stress in 1997, largely attributable to the fact that its rates are at or slightly above the cost of alternative supplies of power available on the wholesale power market while, at the same time, most of its power sale contracts expire by

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<sup>6</sup> "BPA on the Brink," American Rivers, 1995.

<sup>7</sup> See "Memorandum of Agreement among Department of Army, the Department of Commerce, the Department of Energy and the department of Interior Concerning the Bonneville Power Administration's Financial Commitment for the Columbia River Basin Fish and Wildlife Costs," September 16, 1996.

2001. On the other hand, once nuclear plant debt is retired (by 2012), BPA power will likely again be a bargain.

The financial pressures facing BPA helped lead to the creation of the Comprehensive Review of the Northwest Energy System, a year-long collaborative effort among a group of PNW stakeholders convened by the region's four governors. The goal of the review was to develop recommendations regarding the restructuring of the region's electric industry, in part so as to retain the long-run benefits of the BPA system for the region.

The effort resulted in the December, 1996, report entitled "Toward a Competitive Electric Power Industry for the 21st Century." Among the recommendations adopted by the review's Steering Committee are measures to encourage continuing reliance on BPA for power supplies during the period when its rates may be above-market and a proposal to break BPA into two entities, one owning BPA's transmission system and the other owning and marketing hydropower. One Steering Committee member dissented from the report stating his opinion that no regional consensus on power issues is possible absent resolution of how the hydro system should be re-operated to recover endangered salmon stocks, an issue which the Committee recognized but did not resolve.<sup>8</sup>

**b. Western Area Power Administration.**—Western was created in 1977 with the enactment of the Department of Energy Reorganization Act. Western markets power from 55 federal hydro plants containing about 10,000 MW of capacity and located in the Colorado, Sacramento/San Joaquin, Missouri and Rio Grande river basins.<sup>9</sup> This power is sold in 16 states stretching from California to Minnesota to about 640 customers, almost all of them wholesale preference power utilities. Western also operates an extensive transmission system, containing nearly 17,000 miles of line. The largest dams—all but Oahe operated by the BOR—from which Western markets power are Hoover Dam (2074 MW, AZ/NV), Glen Canyon Dam (1356 MW, AZ), Shasta Dam (578 MW, CA) and Oahe Dam (786 MW, SD).<sup>10</sup> Western's total sales of power, including resales of fossil-fuel power Western purchases to meet its contract demands, have averaged between 40% and 50% of BPA's total sales in recent years.

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<sup>8</sup> "Final Report, Toward a Competitive Electric Power Industry for the 21st Century," Comprehensive Review of the Northwest Energy System, December 12, 1996, Concurring and Dissenting Views of Rick Applegate, West Coast Conservation Director, Trout Unlimited.

<sup>9</sup> "Western Area Power Administration, Annual Report, 1996," p. 8.

<sup>10</sup> A complete listing of dams from which Western markets power is provided in Attachment B.

Western's electric rates, like BPA's, are subject to review and confirmation by the Federal Energy Regulatory Commission (FERC). Otherwise, Western operates with considerable discretion under authorities contained in project authorizations, the Flood Control Act of 1944, the DOE Organization Act of 1977 and the National Energy Policy Act of 1992 (EPACT) and caselaw. Western's vast system is broken down into four regions (Desert Southwest, Sierra Nevada, Rocky Mountain and Upper Great Plains). Electric rates are set to recover the costs of 14 different projects in eleven different rate pools.<sup>11</sup> Among the key policies under which Western operates are:

1. Western markets power from projects authorized primarily for non-power purposes—for example, flood control and navigation in the Missouri River Basin and irrigation and river regulation in the Colorado River Basin, distinguishing these projects from most projects from which BPA markets hydro.
2. Western's rates presently are less freighted with the recovery of non-hydro costs than BPA's. However, Western's power customers are ultimately on the hook for about double the amount of irrigation costs than BPA's customers. Colorado River Storage Project power users are even paying to finance irrigation facilities that are not yet and may never be built.
3. Unlike BPA, Western is not a utility, having an obligation only to meet contract electric demands but not load growth.
4. Contrary to BPA, neither Western's electric resource acquisitions nor its fish-recovery investments are subject to guidance by a regional policy-setting compact commission. Under section 114 of EPACT, Western's customers are required to prepare Integrated Resource Plans (IRP) showing how they will integrate energy conservation and environmental considerations into their use of power provided by Western.
5. Western's power sales, like BPA's, are governed by preference clauses that enable public and quasi-public agencies to exercise an option to purchase electricity from Western within available supplies.

Western is not under the same financial stress in 1997 as BPA. Power from Western still generally costs less than the power of the same quality available in the market. However, like all other electricity sellers, Western is not immune to competitive pressures. As the power grid continues to open,

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<sup>11</sup> See "Western Area Power Administration, Appendix to the Annual Report, 1996," p. 1, 19.

alternative low-cost supplies are becoming available to Western's customers. However, unlike BPA, Western's power sale contracts expire on a staggered basis beginning in 2000.

Adding to the worries occasioned by competitive pressures, environmental organizations want Western's power customers to pay for environmental mitigation associated with the hydro plants. Administration and congressional budget deficit hawks would like to accelerate Western's recovery of both power and irrigation costs. And investor-owned utilities and others see enormous value in Hoover Dam and other hydro plants and Western's transmission assets that might be translated into profits if these assets could be privatized.

## 2. Non-Federal Hydro

The roughly 20,000 MW of hydro capacity in the West that is non-federal is regulated under the Federal Power Act (FPA). Under Part 1 of the FPA, nearly all non-federal owners of hydro plants must obtain a license from the FERC in order to construct and operate these plants.<sup>12</sup>

Until 1986 the FERC and its predecessor, the Federal Power Commission (FPC), acted as if they had been directed by Congress solely to promote hydropower generation on the nation's rivers, in the opinion of environmental organizations in disregard of the impact on the riverine environment and, in the opinion of many states, in disregard of state water law. In 1986 Congress amended the FPA's hydro licensing provisions to require balance in the implementation of these authorities. In particular, Congress required the FERC—

*In deciding whether to issue any license...in addition to the power and development purposes for which licenses are issued, ...[to] give equal consideration to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of, fish and wildlife...the protection of recreational opportunities, and the preservation of other aspects of environmental quality.*

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<sup>12</sup> FERC's licensing jurisdiction extends to hydropower dams that (1) occupy federal lands or reservations, (2) are located on navigable streams, (3) use surplus water from a federal dam or (4) were constructed after 1935 and are located on a non-navigable stream that affects the interests of interstate or foreign commerce (including providing power to the grid.) See "River Renewal, Restoring Rivers Through Hydropower Dam Relicensing," May 1996, American Rivers and the National Park Service. Small hydropower dams, with less than 5 MW of capacity, may apply for an exemption from the licensing provisions of the FPA. See 18 CFR 4.90 et. seq.

Section 4(e), FPA. Still unresolved, however, is the tension between the FERC and state river policies.

The greatest effect of this change in legislative direction is felt at the re-licensing stage. That is, in the 1990s the FERC receives relatively few applications for new licenses to construct and operate major new hydro plants. However, many existing licenses, usually issued for fifty years, are expiring and must be renewed in a process known as relicensing. Starting in 1993 the initial FERC licenses of many of the nation's non-federal dams began to expire in big numbers. In 1993 160 licenses affecting 237 dams on 105 rivers expired. Another 550 more dams are due for relicensing by 2010.<sup>13</sup>

The "equal consideration" requirement set forth above applies at relicensing, giving environmental advocates, fish and wildlife agencies and others a new opportunity to mitigate environmental damage caused by the nation's stock of non-federal hydro plants. Indeed, environmental organizations have used this opportunity to negotiate mitigation of environmental damage associated with a number of non-federal hydro plants.<sup>14</sup> However, as in the case of BPA and Western, non-federal dam owners worry about the impact of the cost of mitigation measures on the price of hydropower in newly competitive electricity markets.

The initial licenses of nearly 13,500 MW of hydro capacity, or about two-thirds of the West's non-federal hydro capacity, expire between 1997 and 2010.<sup>15</sup> Most of this capacity is located in the Pacific Northwest and California. Thus, the stage is set for some significant contests before the FERC over the operation of much of the non-federal hydro generation capacity in this region.

Under PURPA non-utilities were encouraged to invest in cogeneration and small power facilities (QFs), including small hydro power plants. Among the benefits extended to PURPA QFs was a guaranteed rate for sale of power equal to a utility's "avoided costs." Relatively high utility avoided costs encouraged investors in small hydro plants to file license or exemption applications with the FERC in enormous numbers in the early 1980s. However, avoided costs began a decline in the mid-1980s from which they have not recovered. This has hurt the market for small hydro facilities financed under the provisions of PURPA. Only a little more than 400 MW of PURPA QF small hydro capacity is now in place in the West.

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<sup>13</sup> "Relicense Forecast, 1993-2010," Office of Hydropower Licensing, Federal Energy Regulatory Commission, Washington, D.C., December, 1993.

<sup>14</sup> See "River Renewal, Restoring Rivers Through Hydropower Dam Relicensing," May 1996, American Rivers and the National Park Service.

<sup>15</sup> Attachment C lists the western non-federal dams that are subject to relicensing between 1997 and 2010.

### III. The Issues

This section discusses the key issues that western hydro faces in 1997. They include:

- The impact of electric-industry restructuring on hydro;
- Pressure to mitigate the impacts of hydro on the aquatic environment and on recreational values;
- Interest in the privatization of federal hydro facilities; and
- Whether BPA and Western are repaying to the U.S. Treasury the costs for which they are liable and related subsidy issues.

#### A. Electric Industry Restructuring

The supply of electricity to the typical retail customer of an electric utility is the result of a three-step process: the generation of the power, its transmission from the power plant to the general area where it is used and its distribution to individual customers. Until recently, this three-step process was understood to be a "natural monopoly." That is, it was assumed that electricity could be generated, transmitted and distributed and then sold less expensively by only one provider in any geographical area, as long as that provider was subject to regulation to prevent monopoly profits.

The events of the last 25 years have robbed generation, if not transmission and distribution, of its natural-monopoly status. Among other things, new, highly efficient ways of combusting natural gas combined with low gas prices have enabled non-utility power producers to generate power for less cost than many utilities, many of whom are saddled with expensive nuclear, PURPA QF and coal-fired capacity. Moreover, federal legislation and regulation, starting with PURPA in 1978 and culminating in 1996 with the issuance of FERC Order No. 888, have encouraged non-utility power generation and opened up the transmission grid so that new, cheap power supplies can reach distant markets. The next step, one that about a dozen states<sup>16</sup> have already taken, is to require the local utility to allow its retail customers to buy power from whomever they want, so-called "retail wheeling."

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<sup>16</sup> In the West, Arizona, California and Montana have made a commitment to implement retail electricity competition. Nevada seems poised to do so. Virtually all other western states are studying it.



The adjustments the electric industry is making to accommodate competition in power generation are collectively known as "restructuring." Among the many implications of restructuring is that past investments in generation capacity that cost more than power available on the open market are vulnerable to being "stranded," that is, left without a revenue stream to cover their costs. Estimates of stranded generation costs in the U.S. range as high as \$250 billion.

In theory, investments in hydro are strandable. Whether there is a real threat that hydro will be stranded depends on a comparison of the costs of hydro with power available on the market. Unfortunately, this comparison is fraught with difficulty, in part because it is impossible to know the market prices of power in the future. Moreover, the cost of hydro on a per-kilowatt-hour basis in any year depends on variable precipitation levels: the more precipitation, the lower the price, assuming adequate levels of storage. In addition, there are various kinds of power now available on the market, among them spot, short- and long-term firm, complicating the comparison. Nonetheless, we have ventured a comparison.

Spot-market power has been available off the western grid in recent months for as little as 10-20 mills per kilowatt-hour (kWh). Short-term firm and long-term firm power costs more, in the range of 20-30 and 30-40 mills/kWh respectively. How do hydro costs compare with these prices? We made no study of the costs of non-federal hydro for this report. As a general matter, however, hydropower generated from old non-federal plants, those that are approaching re-licensing, is inexpensive because much of the capital costs of the facilities have been recovered through electric rates by now. As well, of course, hydro carries no "fuel" cost. On the other hand, some older non-federal hydro plants are due for rehabilitation. In addition, non-federal hydro that is owned by for-profit entities must be priced to earn a profit on equity investment, a cost of capital that exceeds that of the debt capital used to finance non-profit hydro. Taking these factors into account, we believe that much non-federal hydro, even when priced to recover both capital and operating costs, is competitive with long-term firm power available on the market if not, perhaps, with spot prices. An exception may be recently constructed hydro plants, especially those financed under PURPA contracts that time has proven to be above-market.

Much federal hydro enjoys the same cost advantages as non-federal hydro and some of its own, including federal financing at low interest rates and flexibility of repayment of debt. However, as discussed above, the sale of federal hydro is encumbered with the recovery of other costs, including for BPA regional nuclear power plant debt. BPA's average electricity rate in

1996 was 25 mills per kWh.<sup>17</sup> This appears to compare favorably with long-term firm power available on the market but is likely about equal to or even slightly above PNW short-term firm power supplies. Many utilities in the West are buying only short-term firm power supplies until they understand better the path of restructuring. The result is that the price of BPA's firm power in 1996 had no clear price advantage in today's PNW energy market.

Western's rates appear to compare more favorably with market prices. Table 4 summarizes the results of an estimate we made of the value of energy purchased from Western, as measured by the difference between Western's rates and the cost of power on the market.

Our assumptions regarding Western's rates were developed on the basis of Western's rates today and discussion with Western employees and others regarding the trajectory of the rates in the future. Our assumptions of market prices of power in the Western regions are based on discussions with utilities and power brokers in each of the five rate regions for which we prepared the estimate. Our market price assumptions, which imply real growth in the price of long-term firm power of 2% per annum, reflect natural gas price forecasts in the mid-level range. Finally, in preparing the estimate, we used a 10% discount rate and we assumed a level of sales based on the continuation for twenty years of power sale contracts that are in place today.

Obviously, time could prove our assumptions and estimate wrong. For example, some foresee real declines in the price of power in the West, attributable to new, cheaper generation technologies. Others believe that power prices will rise more rapidly than we assumed, especially if natural gas prices increase. As a result, we present Table 4 only as a reasonable illustration of our contention that there is considerable value inherent in electricity purchased from Western over the next twenty years. Table 4 is certainly not a forecast.

Table 4 suggests that Western power at rates that are available for twenty years is very competitive with long-term power supplies in the West. Indeed, we estimate that the net present value of the difference between projected Western rates and assumed long-term firm alternatives may exceed \$5 billion systemwide over the next 20 years. Western's long-term firm power even appears competitive with short-term firm power supplies.

Table 4 suggests that hydro purchases from Western are a good deal, although not as good a deal as they were prior to the onset of restructuring. In an era in which electric customers in the United States increasingly

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<sup>17</sup> "Fast Facts," Bonneville Power Administration, 1997.

Table 4.—Estimate of western vs. market revenue streams for long-term,  
firm power in the West  
(1998-2018)

Power Marketing Region	2000	2005	2010	2015
<b>Pick-Sloan/Upper Great Plains</b>				
WAPA's Rates - mills/kWh:	14.5	15.5	18.0	19.7
Projected Market Rates:	31.2	34.4	38.0	42.0
Net Present Value of Difference Over 20 Years:				\$1.708 Billion
<b>Sierra Nevada</b>				
WAPA's Rates - mills/kWh:	19.6	20.8	22.0	23.3
Projected Market Rates:	33.8	37.3	41.2	45.5
Net Present Value of Difference Over 20 Years:				\$1.278 Billion
<b>Salt Lake City Area/Integrated Projects</b>				
WAPA's Rates - mills/kWh:	20.2	20.9	22.1	23.3
Projected Market Rates:	31.2	34.5	38.1	42.0
Net Present Value of Difference Over 20 Years:				\$0.952 Billion
<b>Loveland/Rocky Mountain</b>				
WAPA's Rates - mills/kWh:	24.5	27.5	30.0	31.7
Projected Market Rates:	28.6	31.6	34.9	38.5
Net Present Value of Difference Over 20 Years:				\$0.086 Billion
<b>Desert Southwest</b>				
WAPA's Rates - mills/kWh:	11.6	12.2	12.9	13.7
Projected Market Rates:	31.2	34.5	38.1	42.0
Net Present Value of Difference Over 20 Years:				\$1.748 Billion
TOTAL NPV of Delta Over 20 Years System-Wide:				\$5.739 Billion

purchase power from competitive markets, some are asking how the value of the Western resource—the difference between Western's cost-based rates and market power prices—should be allocated. Should all of the value flow to preference power users, more or less the situation today under existing law? Should some flow to the taxpayer to reduce the federal deficit? Should some go to environmental mitigation on the rivers from which Western markets power? What happens to this value if there is privatization? Would it leave the region? Who should answer these questions?

We conclude that, in general, western hydro can survive utility restructuring. Even on the BPA system hydro would be competitive but for the load it carries of nuclear power plant costs.

## **B. Environmental Mitigation**

The impacts that dams can have on the aquatic environment and on recreation are well-known. They include:

- Blockage of rivers, harming fish migration and spawning as well as certain kinds of water-based recreation
- Alteration of the timing and magnitude of flows, harming the same values
- Alteration of water temperature, harming fish spawning
- Alteration of the chemical make-up of downstream flows, harming fish and, possibly, even human health
- Entrapment of nutrients and sediment, harming riparian habitat and related values
- Diverting fish through hydropower turbines, injuring or killing them.

The river basin studies submitted to the Water Commission reveal that some or all of these problems exist in every major river basin in the West. These studies also suggest that the generation of hydropower, as one of several uses of western dams, contributes to these impacts in ways that are often hard to quantify and that vary by river basin.

Perhaps nowhere is it easier to make the case that hydro is a root cause of damage to fish than in the PNW. John Volkman's report, "A River in Common: The Columbia River, the Salmon Ecosystem, and Water Policy," describes how dams constructed solely or primarily for power production

have contributed to the decimation of salmon stocks in the region. Yet, even in this region, there appear to be other causes of the problem, including consumptive water uses, navigation requirements, flood control, forest practices and ocean conditions.

Dale Pontius's report on the Colorado River Basin describes the role that hydropower production at the Glen Canyon Dam for peaking purposes had in altering riparian habitat and recreational values below the dam. Yet in this basin it is hard to avoid the conclusion that hydropower production, often only an incidental use of the water impounded behind the dams, is but one of several causes of damage to the ecosystem of the basin. Consumptive water uses and river regulation for compact purposes also appear to contribute to the damage.

Elsewhere, hydro's role in degrading western river environments appears spotty. In California, operation of Shasta dam for hydro purposes contributed to a large decline in certain chinook salmon runs, but certainly other uses of water at the dam and at other non-hydro facilities have made significant contributions to the problem.<sup>18</sup> It is hard to argue with the proposition that it is irrigation that has had the most impacts on the natural environment in the Central Valley. On the Platte system, Leo Eisel and David Aiken's report shows how past operation of Kinglsey Dam for hydro has contributed to downstream environmental problems, but irrigation, as in the Central Valley, appears also to contribute significantly to the deterioration of the natural systems of the river.

On the Rio Grande, it appears to be difficult to pin responsibility for environmental problems mainly on hydro because of the small size of the river's hydro plants as well as the relatively greater importance of other river uses. Finally, it is our impression that the impact of operation of hydro capacity on the mainstem of the Missouri River on fish and other environmental values, as opposed to operation for flood control and navigation, is not yet well understood.

Partly because it has caused environmental damage and partly because it is perceived as the "deep pocket" of western project water uses, federal hydro has been asked to contribute in two basic ways to environmental mitigation on western waterways: re-operation and raising money for mitigation investments from power sales. The clearest example of re-operation is at Glen Canyon Dam, in which flows through the power turbines formerly were maximized to meet regional peak electric demands but now mimic more

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<sup>18</sup> See "Restoring the West's Waters: Opportunities for the Bureau of Reclamation, Volume I, Section 2.15, Shasta dam, Central Valley Project, Sacramento River, California," Natural Resources Law Center, February, 1996

closely natural flows. In addition to paying for the EIS that was prepared to determine the new flow regime at the dam, Glen Canyon power users also must also pay for replacement for the roughly 700 MW of peak power that was lost as a result of the re-operation. BOR and COE dams on the Columbia have also been re-operated for fish recovery purposes, with the consequent loss of power revenues to BPA.

BPA power users in the PNW also pay for the capital costs of mitigation through their power rates. However, as Section II discussed, it is at best questionable whether electricity users can be counted on to pay whatever it costs to recover the fish in a competitive electricity market, at least for as long as these power users also have to pay to retire nuclear power plant costs. In addition, since it appears that there are other causes of damage to fish stocks, there remains the question whether it is equitable to impose the entire regional burden for fish recovery on BPA power users.

On the Western system power users on the Upper Colorado River help pay for endangered fish recovery efforts, in particular the Recovery Implementation Plan for Upper Colorado River endangered fish. As in the PNW, the federal government continues to help pay for fish restoration in the Colorado River Basin. Subsection A, above, suggests that competitive electricity market conditions are not a bar to Western power users paying a larger share of environmental mitigation and protection measures throughout the area served by its customers.<sup>19</sup> However, there is again the question of whether it is equitable to ask Western power users to pay an ever-increasing amount for such efforts when other uses of river water in the Western system appear to make significant contributions to environmental damage. On the other hand, assessing power for the costs of environmental mitigation spreads the cost among millions of people in the region, since virtually everyone in the areas served by Western's customers uses electricity.

Finally, there seems to be little question that non-federal hydro capacity has contributed to aquatic environmental damage in the region, especially in the PNW. The major opportunity to encourage non-federal owners of hydro capacity to contribute to mitigation—as BPA hydro users have for years—is in the dozens of relicensing cases now just getting underway before the FERC. We feel sure that some of these owners will argue that competitive market conditions limit their ability to re-operate their facilities for the fish and to invest in mitigation measures. In response, others will argue that to

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<sup>19</sup> It appears that, with the possible exception of the Upper Colorado River Basin, less is known than in the PNW about the measures, and their costs, that would be appropriate to implement to mitigate environmental damage on rivers from which Western markets hydropower.

fail to take these steps externalizes to the environment real costs of hydro production. Thus, these relicensing cases will join major issues of energy and environmental policies on the region's rivers. Interestingly, the issues will be resolved by a distant federal agency with, at the moment, no commissioner from the West.

### **C. Privatization**

In the mid-1980s Ronald Reagan proposed that the federal government divest itself of BPA. The reaction was swift. Powerful PNW senators attached a rider to appropriation legislation that not only prohibited the sale of BPA and the other federal PMAs but also prohibited the Executive Branch from even studying such a sale. This law remains in effect today. At least in the 1980s divestiture of federal hydro assets was an idea whose time had not come.

By the mid-1990s the sale of the smallest federal PMA, the Alaska Power Administration had been authorized. In 1995 broader PMA sale legislation, including a bill authored by the Clinton Administration to sell other PMAs, including Western but not BPA, were under consideration in Congress. One bill, which would have sold the Southeastern Power Administration (SEPA, serving customers in southeastern states) to the highest bidder, while suspending federal environmental laws, reached the floor of the U.S. House of Representatives. A strong effort by preference power customers, environmental and other interests blocked this legislation. No further action on broad PMA sale bills has been taken in Congress since then.

Does this activity mean that divestiture's time has finally arrived? Probably not, or not yet. It does mean, though, that it is an idea that will not go away as quietly as it did in the 1980s. In particular, the results of electric industry restructuring may provide support for the notion that it is time to get the federal government out of the power-production business.

Those who favor privatization, or more properly "defederalization,"<sup>20</sup> argue that there is no reason for the federal government to own and operate hydro facilities any more. There are others, primarily electric utilities, who could operate the plants more efficiently and without having to depend on congressional appropriations. In addition, proponents believe that sale of the PMAs will reduce the federal budget deficit.

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<sup>20</sup> "Privatization" implies that the purchasers of federal hydro assets will always be private entities, when public entities such as preference power customers, have expressed interest in owning these assets.

Those who oppose defederalization point out that federal hydro plants, especially the large ones, are part of projects that serve many other purposes, including irrigation, flood control, navigation, municipal water supply, recreation and fish recovery and protection. Turning over dams and reservoirs to utilities and others whose sole interest is in maximizing power revenues threatens these other purposes. Moreover, opponents contend that the only way to reduce the deficit by the sale of federal hydro facilities is to sell them for more than the net present value of the revenues that the facilities would have raised through the sale of power. That likely means that the new owners will have to raise the power rates of those who presently buy federal hydropower in order to cover the costs of their purchases. The impact on preference power users could be significantly higher electric rates.

In response to these contentions, some utility interests who support defederalization say they might be willing to live with acquiring only the power generation equipment and transmission lines, leaving the dam, impoundment and other non-power assets in federal ownership. These interests also point out that, since the electric transmission grid is now open, cheap alternative sources of power are available to preference power users, thereby keeping a lid on what the new owners might charge.<sup>21</sup> In addition, when preference-power users include such places towns and cities as Aspen, Vail and Los Angeles, it is no longer fair, proponents of defederalization say, to allocate cheap federal hydro only to these customers.

Without declaring a winner of this debate, it is safe to say that defederalization is about money, potentially the reallocation of economic value from one set of stakeholders to another. On the Western system the great bulk of the value of federal hydropower (as measured by the difference between Western's rates and the cost of power purchased from the market) flows to Western's customers. Defederalization threatens to divert that value from those customers to other interests, in particular, private investors and interests outside the region. On the other hand, if defederalization were

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<sup>21</sup> One proposal for defederalization, set forth in "Lights out on Federal Power," by Prof. Michael Block for the Progress and Freedom Foundation in 1996, would transfer the value inherent in federal hydro facilities to the end-users of federal preference power through the issuance of stock warrants. The authors hope that this would eliminate the opposition of preference power customers to defederalization. A second aspect of their proposal is to transfer, for free, the ownership of federal projects that contain hydro plants to "river basin associations." These associations would be comprised of all river basin stakeholders, including irrigators, municipal water providers, environmentalists, recreation businesses, the states and others who would manage the projects largely free of federal interference. The hope is that this proposal would eliminate opposition to defederalization based on concerns regarding what might happen to the non-power purposes of defederalized projects. Congressman John Shadegg (R-AZ) has introduced legislation (H.R.296, 105th Congress) that would implement the first part of this proposal, but not the second part.



to result in simply transferring the assets to today's customers—as was proposed by the Clinton Administration in 1995—, the value would continue to be allocated largely as it is today. However, the loss of federal ownership of the assets could threaten the aquatic environment if, as has been proposed by others, environmental laws are waived as part of the deal.

Today, there is considerable opposition to broad PMA transfer legislation. In particular, preference power users strongly oppose it and believe that they can stop it, especially in the U.S. Senate. Environmental organizations are skeptical of defederalization, although they could support it under conditions spelled out in a statement of principles attached here as Attachment D. In the PNW, many fear the sale of BPA because it could relieve the region of the long-term benefits of the region's cheap hydro resource. Indeed, one of the reasons why the governors convened the four-state review committee discussed in Section II was to stave off defederalization of BPA. The Clinton administration, once favorable to the sale of the PMAs other than BPA, has cooled to it.

At this point, then, the outlook for passage of broad PMA defederalization legislation is unfavorable. What might change this outlook? Perhaps defederalization could "move" as part of broad federal electric restructuring legislation, although there is little to suggest that packaging defederalization in restructuring would overcome the stiff opposition to it among preference power users. In any event, broad restructuring legislation appears in a deep stall in Congress, even while the states are moving ahead.

A second way in which defederalization might be given new life in Congress is if the long-term price advantage of federal hydro disappeared. This could happen in two ways. First, Congress might direct reforms designed to address some of the issues discussed in subsections B and D of this section, thereby raising the cost and price of federal hydro. Or competition in the electric power industry may turn out to provide alternative power supplies at costs that compare favorably with federal hydro over the long-run. Under either or both scenarios, the long-term price advantage of federal hydro might wane to the point where there is no clear benefit in being a preference power customer. Neither is a likely scenario at this point in time.

The dim outlook for congressional action to allow divestiture of the PMAs has not discouraged proposals to transfer individual, small federal water/power projects to non-federal interests. Indeed, the BOR has offered to entertain transfer proposals for "uncomplicated" projects, as long as they comply with the BOR's "Framework" asset transfer principles, which include compliance with NEPA prior to transfer. So far, no transfers that have gone through the BOR's Framework have been sent to Congress for action. A few legislative proposals to direct the transfer of projects that do not comply with the Framework have been introduced in this Congress and have been met with

opposition by the Administration and environmental organizations. The fate of these proposals in Congress is uncertain.

#### D. Repayment and Subsidy Issues

Subsections A-C suggest that western federal hydro is in a squeeze play between restructuring, environmental and, to a lesser extent, privatization pressures. The other pressure under which federal hydro operates is, of course, the requirement to pay the capital and operating costs for which hydro is liable under federal law. To complete the picture, this subsection briefly describes the nature and status of western hydro's repayment obligations and related subsidy issues.

According to the U.S. General Accounting Office, as of September 30, 1994, BPA owed \$17.6 billion, an increase of roughly \$3 billion of debt from 1985.<sup>22</sup> \$832 million of this debt was for irrigation costs assigned to power users as beyond the ability of the irrigators to pay.<sup>23</sup> Western's debt was \$3.7 billion, an increase of roughly \$1.4 billion from 1985.<sup>24</sup> \$1.6 billion of Western's 1994 debt is for irrigation expenses assigned to power users.<sup>25</sup>

Western's annual budgets are funded by congressional appropriations, whereas BPA's are funded out of a revolving fund created in 1974. Both BPA and Western must repay debt and operating costs incurred not only by them but also by project operating agencies (the BOR and COE) that are related, or have been assigned, to power use. BPA and Western are required to repay operation and maintenance expenses in the same year they are incurred and appropriated and other debt over varying repayment periods.

According to the Committee Report discussed in Section II, BPA has not deferred a payment to the U.S. Treasury in 13 years.<sup>26</sup> However, the report states that, between 2002-2006, BPA owes \$2.1 billion to the U.S. Treasury.<sup>27</sup> Will BPA be able to make these payments if some of its contracts are not renewed in 2001 and the price of electricity on the open market is competitive with BPA's rates?

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<sup>22</sup> "Federal Electric Power, Operating and Financial Status of DOE's Power Marketing Administrations, " U.S. General Accounting Office, October, 1995, Appendix II, Table II.2, p. 42.

<sup>23</sup> *Id.*, Figure 5, fn 4, p. 11.

<sup>24</sup> See fn 22.

<sup>25</sup> See fn 23.

<sup>26</sup> See fn 8, Committee Report, p. 15.

<sup>27</sup> *Id.*

Western was a subject of a 1996 GAO report that analyzed whether three PMAs were repaying the U.S. Treasury for all power-related costs.<sup>28</sup> While the GAO concluded that Western was following repayment regulations, GAO also concluded that Western was not repaying the Treasury for all power-related costs. For example, GAO found that Western had "deferred" repayment of \$195 million of expenses as of September 30, 1995.<sup>29</sup> In another report<sup>30</sup> GAO found that Western's Pick Sloan electricity customers were not paying for power that they use and that is generated by \$454 million of hydropower and water storage facilities in the Pick-Sloan Project. These are facilities that are now used for power production, the costs of which were allocated to irrigation features that were never built. GAO concluded, however, that only Congress could reallocate the costs of these facilities to power so that they could be reimbursed to the Treasury through power rates.

GAO also described how Western's manner of repayment of its debt constitutes a subsidy by the taxpayer of power.<sup>31</sup> In short, U.S. Department of Energy policy generally requires Western to repay outstanding debt with the highest interest rate first, regardless of maturity date. This results in a financing subsidy by the taxpayer to the power user because it maximizes the spread between the interest rate on Western's unamortized debt and the higher current U.S. Treasury borrowing rates. In 1995, the GAO estimated, this financing subsidy amounted to about \$115 million.<sup>32</sup>

Under reclamation law both BPA and Western charge power users for project irrigation-related costs which are deemed to be beyond the ability of the irrigators to repay. Fully 43% of Western's debt to the U.S. Treasury and about 5% of BPA's debt is tied up in these costs.<sup>33</sup> Because there is no interest payment on irrigation debt, the PMAs repay these costs last, when they are due, 50 or 60 years after they were incurred. According to the GAO, the resultant financing subsidy in 1995 on the Western system, again by the taxpayers, this time for the benefit of both irrigators and power users, was \$137 million.<sup>34</sup>

The fact that both Western and BPA postpone repayment of irrigation costs for which power users are responsible shows that a common perception in the

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<sup>28</sup> "Power Marketing Administrations, Cost Recovery, Financing, and Comparison to Nonfederal Utilities," U.S. General Accounting Office, September, 1996.

<sup>29</sup> Id. p. 43.

<sup>30</sup> "Federal Power: Recovery of Federal Investment in Hydropower Facilities in the Pick-Sloan Program," U.S. General Accounting Office, May, 1996.

<sup>31</sup> See GAO Rept., fn 28, pp. 52-56.

<sup>32</sup> See GAO Rept, fn 28, p. 53.

<sup>33</sup> Percentages derived from information cited in GAO Rept., fns. 22-25.

<sup>34</sup> See fn 28, p. 56.

West—that hydro revenues are the "cash cow" used to repay the taxpayer for the lion's share of the costs of irrigation facilities provided by reclamation projects—is, so far, a myth. According to the U.S. GAO, the facts are as follows:

1. Of the \$16.9 billion which the BOR has determined are reimbursable costs of the projects it has built, \$7.1 billion have been allocated to irrigation.<sup>35</sup>
2. Roughly \$3.4 billion of the \$7.1 has been shifted to power users as being beyond the ability of irrigators to pay.<sup>36</sup>
3. Irrigators have also been relieved of the requirement to repay about \$373 million through legislative "charge-offs," leaving irrigators with the responsibility to repay about \$3 billion.<sup>37</sup> Irrigators have already repaid \$945 million of the \$3 billion debt as of September 30, 1994.<sup>38</sup>
4. By contrast, because of the policy described above to repay lowest- and zero-interest-rate debt last, Western has repaid only \$32 million of irrigation debt, leaving \$1.5 billion irrigation debt on its books as of 1994.<sup>39</sup> By the mid-1990s, BPA had repaid no irrigation debt.<sup>40</sup> In short, irrigators have repaid roughly 30 times more irrigation debt to the U.S. Treasury than power users have.

In reality, then, federal hydro has not, so far, been a cash cow for repayment of project irrigation costs.<sup>41</sup> Taxpayers have stepped into the void created by the failure of power users to repay irrigation debt. Last year saw the introduction of legislation in Congress by legislators from outside the region to end this and other alleged federal hydro subsidies.<sup>42</sup>

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<sup>35</sup> "Bureau of Reclamation, Information on Allocation and Repayment of Costs of Constructing Water Projects," U.S. General Accounting Office, July, 1996, p. 4.

<sup>36</sup> *Id.*

<sup>37</sup> *Id.*

<sup>38</sup> *Id.*, p. 5.

<sup>39</sup> See GAO Rept., fn 28, p. 56.

<sup>40</sup> "River in Common: The Columbia River, the Salmon Ecosystem, and Water Policy," John M. Volkman, June, 1997, p. III-36.

<sup>41</sup> One instance of power users acting as a cash cow for irrigation is in the rates established for "project power." Under reclamation law electric power generated at reclamation projects is sold, first, to meet project needs, including irrigation pumping. The rate for this "project power" is set to recover only the costs of operation, maintenance and replacement of producing the power, but not the cost of the original power investment. Yet, the costs of that share of the original power investment used to generate pumping needs must be repaid by someone. They are, by power users, through power rates that are higher than project power rates.

<sup>42</sup> H.R. 3878, by Representatives Franks, Meehan and others, 104th Congress.

## IV. Conclusion

We believe the foregoing sustains the following statements and suggests the following questions about western hydro:

- A. Hydro makes a significant contribution to power supplies in the West, especially in the PNW where it provides about two-thirds of that region's generation capacity. Policies adopted for hydro can have far-ranging effects on the region's economy and environment.
- B. Restructuring does not really threaten the viability of western hydro, likely even if hydropower pays its share of environmental costs, except where hydropower sales have been asked to recover costs unrelated to hydro, in particular, nuclear power plant costs.
- C. The sales of hydropower by Western are worth billions of dollars when measured against the alternatives available in the western grid. This value now flows almost exclusively to preference power users. Should some of this value flow to achieve other goals, say deficit reduction or environmental mitigation?
- E. A distant federal agency, the FERC, will be making many of the trade-offs between energy and environmental policies on western rivers in the next ten to fifteen years, especially in the PNW. Is this appropriate?
- F. PMA privatization (aka defederalization) fever has cooled some since 1995, but, this time, it will not likely disappear. The two main issues raised by defederalization are: Who gets the value of the hydro systems, as measured by the difference between their cost and the price of power on the open market? And what is the impact on the environment? Will the West be prepared for federal hydro defederalization next time it is seriously considered by Congress?
- G. Federal hydro's debt to the U.S. Treasury is substantial and increasing. And it appears that neither Western nor BPA is making the taxpayer whole. In particular, the American taxpayer is subsidizing power users because neither Western nor BPA is yet repaying irrigation debt in any substantial amounts, contrary to popular perception. Will this arrangement be altered by Congress? Should it be?

In sum, there are large decisions to make about western hydro in the years to come, involving difficult trade-offs and large impacts on the region. In our view this requires that the public, politicians and others beyond the "inside players" learn the issues and stay involved.

## Attachment A

### Federal Hydroelectric Power Plants in the Northwest (Hydropower Marketed by the Bonneville Power Administration)

Plant	River/State	Operator	Size (MW)
Albeni Falls	Pend/Idaho	COE*	22
Anderson Ranch	Boise/Idaho	BOR*	36
Big Cliff	Santiam/Oregon	COE	21
Black Canyon	Payette/Idaho	BOR	9
Bonneville	Columbia/Washington	COE	1,147
Chandler	Yakima/Washington	BOR	10
Chief Joseph	Columbia/Washington	COE	2,543
Cougar	McKenzie/Oregon	COE	25
Detroit	Santiam/Oregon	COR	96
Dexter	Willamette/Oregon	COE	17
Dworshak	Clearwater/Idaho	COE	445
Foster	Santiam/Oregon	COE	22
Grand Coulee	Columbia/Washington	BOR	6,448
Green Peter	Santiam/Washington	COE	79
Hills Creek	Willamette/Oregon	COE	30
Hungry Horse	Flathead/Montana	BOR	354
Ice Harbor	Snake/Washington	COE	567
John Day	Columbia/Oregon/Washington	COE	2,080
Libby	Kootenai/Montana	COE	567
Little Goose	Snake/Washington	COE	797
Lookout Point	Willamette/Oregon	COE	67
Lost Creek	Rogue/Oregon	COE	18
Lower Granite	Snake/Washington	COE	815
Lower Monumental	Snake/Washington	COE	799
McNary	Columbia/Oregon/Washington	COE	985
Minidoka	Snake/Idaho	BOR	13
Palisades	Snake/Idaho	BOR	122
Roza	Yakima/Washington	BOR	4
The Dalles	Columbia/Oregon/Washington	COE	2,074
<b>Total (29)</b>			<b>20,212</b>

\* Army Corps of Engineers (21 dams) and Bureau of Reclamation (8 dams)  
Source: Bonneville Power Administration

## Attachment B

### Federal Dams in California and the Interior West (Hydroelectric Power Marketed by Western Area Power Administration)

Plant	River/State	Operator	Size (MW)
Hoover	Colorado/Arizona/Nevada	BOR	2,074
J.F. Carr	Clear Creek/California	BOR	154
Folsom	American/California	BOR	215
Keswick	Sacramento/California	BOR	105
New Melones	Stanislaus/California	BOR	383
Nimbus	American/California	BOR	14
O'Neill	San Luis/California	BOR	29
Shasta	Sacramento/California	BOR	578
Spring Creek	Spring Creek/California	BOR	200
Trinity	Trinity/California	BOR	140
Gianelli	San Luis/California	BOR	202
Amistad	Rio Grande/Texas	IBWC	66
Falcon	Rio Grande/Texas	IBWC	32
Big Thompson	Trans. Mt./Colorado	BOR	5
Estes	Trans. Mt./Colorado	BOR	51
Flatiron	Trans. Mt./Colorado	BOR	95
Green Mountain	Blue/Colorado	BOR	30
Mary's Lake	Trans. Mt. Div.	BOR	8
Mount Elbert	Arkansas/Colorado	BOR	206
Pole Hill	Trans. Mt./Colorado	BOR	33
Yellowtail 1/2	Bighorn/Montana	BOR	144
Alcova	North Platte/Wyoming	BOR	40
Boysen	Wind/Wyoming	BOR	18
Buffalo Bill	Shoshone/Wyoming	BOR	18
Fremont Canyon	North Platte/Wyoming	BOR	66
Glendo	North Platte/Wyoming	BOR	38
Guernsey	North Platte/Wyoming	BOR	7
Heart Mountain	Shoshone/Wyoming	BOR	5
Kortes	North Platte/Wyoming	BOR	39
Pilot Butte	Wind/Wyoming	BOR	2
Seminole	North Platte/Wyoming	BOR	51

*Conclusion*

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Federal Dams in California and the Interior West (continued)  
(Hydroelectric power marketed by Western Area Power Administration)

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Plant	River/State	Operator	Size (MW)
Shoshone	Shoshone/Wyoming	BOR	3
Spirit Mountain	Shoshone/Wyoming	BOR	5
Davis	Colorado/Arizona	BOR	269
Parker	Colorado/California	BOR	69
Canyon Ferry	Missouri/Montana	BOR	60
Fort Peck	Missouri/Montana	COE	218
Yellowtail 3/4	Big Horn/Montana	BOR	144
Garrison	Missouri/North Dakota	COE	546
Big Bend	Missouri/South Dakota	COE	538
Fort Randall	Missouri/South Dakota	COE	387
Gavins Point	Missouri/South Dakota	COE	122
Oahe	Missouri/South Dakota	COE	786
Glen Canyon	Colorado/Arizona	BOR	1,356
Blue Mesa	Gunnison/Colorado	BOR	96
Crystal	Gunnison/Colorado	BOR	28
Lower Molina	Pipeline/Colorado	BOR	5
Morrow Point	Gunnison/Colorado	BOR	156
Taowac	Canal/Colorado	BOR	11
Upper Molina	Pipeline/Colorado	BOR	9
Elephant Butte	Rio Grande/New Mexico	BOR	28
Flaming Gorge	Green/Utah	BOR	152
Fontenelle	Green/Wyoming	BOR	13
Stampede	Truckee/California	BOR	3
<b>Total</b>			<b>10,605</b>

\* Bureau of Reclamation (46 dams), Army Corps of Engineers (6 dams), International Water Boundary Commission (2 dams)  
Source: Western Area Power Administration



## Attachment C

Hydroelectric Dams in the West  
(10 MW or Larger)  
Subject to Relicensing: 1997-2010

Year	Project Name	Owner	Size (MW)
1997	North Umpqua	Pacificorp	262.75
	Lower Salmon	Idaho Power Company	60.00
	Total		322.75
1998	Bliss	Idaho Power Company	75.00
	Total		75.00
1999	Big Creek #4	SCE	91.00
	Upper Salmon	Idaho Power Company	34.50
	Shoshone Falls	Idaho Power Company	12.50
	Total		138.00
2000	Oneida	Pacificorp	30.00
	Hat Creek 1&2	Pacific Gas & Electric	20.00
	C.J. Strike	Idaho Power Company	82.80
	Total		132.00
2001	Cabinet Gorge	Washington Water	211.50
	Yale	Pacificorp	108.00
	Grace & Cove	Pacificorp	40.50
	Mayfield	City of Tacoma	460.00
	Round Butte	Conf. Tribes/Portland	398.66
	Total		1,218.66
2002	Box Canyon	Pend Oreille CO PUD	60.00
	El Dorado	Pacific Gas and Electric	20.00
	Total		80.00
2003	Soda	Pacificorp	14.00
	Poe	Pacific Gas and Electric	142.83
	Pit	Pacific Gas and Electric	317.00
	Total		473.83

Conclusion

Hydroelectric Dams in the West (continued)  
(10 MW or Larger)  
Subject to Relicensing: 1997-2010

Year	Project Name	Owner	Size (MW)
2004	Chelan	Chelan County PUD 1	48.00
	Malad	Idaho Power Company	21.77
	Feather River	Pacific Gas and Electric	342.02
	Bull Run	Portland General Electric	21.00
	Donnells & Beardsley	Oakdale & San Joaquin ID	63.99
	Tulloch	Oakdale & San Joaquin ID	17.10
	Stanislaus Spring	Pacific Gas and Electric	175.80
	Willamette	Portland General Electric	22.50
	Total		712.18
2005	Portal	SCE	10.00
	Kern Canyon	Pacific Gas and Electric	11.50
	Noxon Rapids	Washington Water & Power	460.12
	Prospect 1, 2, & 4	Pacificorp	36.76
	Hells Canyon	Idaho Power Company	1,166.50
	Priest Rapids	Grant County PUD 2	1,877.80
		Total	
2006	Klamath	Pacificorp	231.00
	Swift #1	Pacificorp	204.00
	Baker	Puget Sound Power & Light	324.80
	Swift #2	Cowlitz County PUD #1	70.00
	Rocky Reach	Chelan County PUD #1	1,213.15
	Oak Grove	Portland General Electric	51.03
	North Fork	Portland General Electric	91.90
		Total	
2007	Feather River	Cal. Department of Water	2,165.75
	Upper American	Sacramento MUD	722.26
	Spokane River	Washington Water & Power	121.55
	Mammoth Pool	SCE	181.00
		Total	
2008	Trail Bridge	City of Eugene	124.50
		Total	124.50

Hydroelectric Dams in the West (continued)  
 (10 MW or Larger)  
 Subject to Relicensing: 1997-2010

Year	Project Name	Owner	Size (MW)
2009	Big Creek #2A & 8	SCE	480.07
	Big Creek #3	SCE	177.45
	Big Creek #1 & 2	SCE	225.90
	South Fork	Oroville/Wyandotte ID	104.10
	Boulder Canyon	Public Service of Colorado	20.00
	Merwin	Pacificorp	136.00
	Mystic Lake	Montana Power Company	10.00
	Total		1,153.52
2010	Packwood Lake	Washington Public Power	26.13
	Ames & Tacoma	Public Service of Colorado	11.60
	Swan Falls	Idaho Power Company	25.00
	Total		62.73
TOTAL (1997-2010)			13,431.49

Source: Relicense Forecast 1993-2010, FERC, December, 1993

Attachment D

**Statement of Principles for the Transfer of Federal Water and Power Facilities and Related Assets to Non-Federal Interests**

*American Rivers*  
*Environmental Defense Fund*  
*Grand Canyon Trust*  
*Land and Water Fund of the Rockies*  
*National Audubon Society*  
*Natural Resources Defense Council*  
*Sierra Club Southwest Office*  
*Southern Environmental Law Center*  
*Southwest Environmental Center*  
*Western Colorado Congress*

*August 29, 1996*

Congress and the Administration are considering proposals to transfer federal water and power facilities and related assets to non-federal entities. These transfers could have detrimental impacts on the environment and other interests. Such transfers, however, can provide opportunities to mitigate past environmental damage and otherwise enhance the environment. Therefore, transfers should be authorized and approved only under conditions that enhance the environment and provide continuing protection of other public interests, as follows:

1. *Fair Price.*—The federal taxpayer is entitled to a fair price for any facilities or assets transferred, one that should be set in light of the market value of the facilities. At a minimum, no federal water or power facility should be transferred for a price less than the present value of all associated outstanding repayment obligations, irrespective of adjustments or of the allocation of facility or asset costs among different uses. In addition, the value of any land or other non-water or non-power assets transferred, as well as the present value of any other anticipated receipts to the U.S. Treasury, should either be added to the minimum price or, preferably, reflected in environmental improvements, including ecologically beneficial land given by the transferee, determined as a result of sections 4 and 5, below.
2. *Federal Control.*—Some federal water and power facilities play a critical role in watershed and river management for multiple purposes or in the interstate or international allocation of resources. Control of these facilities should be retained by the federal government.

3. *Compliance with Environmental Laws.*—All transfers should comply with the National Environmental Policy Act, Endangered Species Act, and other federal environmental laws. All transferred facilities should operate in full compliance with such laws.
4. *Facility-specific Transfer Plans.*—Transfers should be carried out only pursuant to facility-specific plans developed by the applicable federal agencies with the input of all stakeholders. The plans should contain minimum terms and conditions that will require transferees to:
  - a. protect existing water resource values that could be affected by the transfer;
  - b. mitigate environmental damage, including damage to fish and wildlife, and otherwise enhance the environment;
  - c. promote the protection and restoration of threatened and endangered species, through measures which may include development and implementation of a habitat conservation plan;
  - d. use any power generation or transmission facilities consistently with national energy policy, especially to support non-hydroelectric renewable resources; and
  - e. avoid adverse impacts on the federal government's ability to fulfill its treaty and trust responsibilities to Indian tribes.
5. *Competitive Bidding.*—Once the above minimum terms and conditions are established, the choice of a transferee and the final transfer price should be made on the basis of bids obtained competitively, in which both price and non-price terms are evaluated.
6. *FERC License.*—Facility-specific transfer plans which include hydroelectric facilities must be incorporated into a special, one-time, temporary FERC license, which should be enforceable as if it were a conventional FERC license. Upon expiration of the special license, a transferee must obtain and operate facilities pursuant to a FERC license issued under the Federal Power Act and other laws applicable to non-federal hydropower facilities, without waiver.

7. *Public Oversight.*—There should be full disclosure of and access to all information material to a full and fair evaluation of any transfer proposal. Appropriate mechanisms for ongoing public oversight of any transferred facilities must be provided so as to assure compliance with the terms and conditions of the transfer.
8. *Impact on the Federal Budget.*—For federal budgetary purposes, net transfer proceeds should reflect both the total receipts from the transfer as well as the total expected revenues foregone by the U.S. Treasury, using the same time periods and discount rates for each revenue stream.