

## **Cost Allocation**

Table F-11 summarizes the above analysis. The table addresses the capital, annual OM&R, and present value of OM&R costs for a scenario that assumes a construction budget of \$60 million per year. The table combines total construction costs, including taxes for the Reclamation-designed system and for the Gallup Regional System. Allocated costs were added for environmental mitigation, cultural resources, and land acquisition, then interest during construction was added. The present value of the annual fixed plus variable OM&R costs (discounted at 4.875 percent) was calculated and estimated under both the CRSP and NTUA energy rates. All financial costs are expressed as of the beginning of the year 2027, the year in which the proposed project would be completed. Interest during construction and interest on pre-project completion water purchase fees are compiled up to January 1, 2027, and post-completion OM&R and post-completion water purchase fees are discounted to January 1, 2027. Next, the total present value of all costs, including capital, fixed OM&R, and variable OM&R costs, is shown. Table F-11 allocates these costs to each of the participants. All costs are based on January 2007 price levels.

Figures F-6 and F-7 illustrate the components of overall cost. Figure F-6 shows how total project costs are split among capital cost, interest during construction, the present value of future OM&R costs, and the present value of water cost. Figure F-7 shows how total project costs are allocated to the three project participants. Figures F-8, F-9, and F-10 show how the cost allocated to each project participant is composed of capital, interest during construction, OM&R, and water costs. Figure F-11 shows what the levelized cost per thousand gallons would be to each project participant, assuming full self-funding.

## **ECONOMIC BENEFIT/COST ANALYSIS**

This economic analysis section is distinct from a financial analysis because an economic analysis is concerned with the generation and use of societal resources instead of the financial analyses' focus on tracing cash receipts and expenditures. Because Reclamation is overseeing the planning of the proposed project and its participants are seeking monetary support from the Federal Government, the resources of concern are those of the United States as a whole. The principal differences between this economic analysis and a financial analysis are:

- Inclusion of non-cash project costs that would affect third parties (diminished power generation and increased salinity effects)

Table F-11.—Present value of total costs (2007)

<b>Total capital costs by user</b>				
	<b>Navajo</b>	<b>City of Gallup</b>	<b>Jicarilla Apache Nation</b>	<b>Total</b>
Allocated construction costs – main system	\$620,700,000	\$115,800,000	\$30,400,000	\$766,900,000
Allocated capital costs – Gallup Regional	18,600,000	29,900,000	0	48,500,000
Allocated environmental mitigation cost	4,700,000	1,100,000	200,000	6,000,000
Allocated cultural resources cost	27,100,000	6,200,000	1,300,000	34,600,000
Allocated ROW cost	7,100,000	1,600,000	300,000	9,000,000
Total project capital cost before interest	678,200,000	154,600,000	32,200,000	865,000,000
Allocated interest during construction	317,000,000	72,300,000	15,100,000	404,300,000
<b>Total project capital cost</b>	995,200,000	226,900,000	47,300,000	1,269,400,000
Rounded values	995,000,000	227,000,000	47,000,000	1,269,000,000
<b>Annual OM&amp;R costs by user (at design capacity)</b>				
	<b>Navajo</b>	<b>City of Gallup</b>	<b>Jicarilla Apache Nation</b>	<b>Total</b>
<b>CRSP rates</b>				
Allocated OM&R costs – main system	\$9,542,654	\$2,075,238	\$743,636	\$12,361,528
Allocated OM&R costs – Gallup Regional	311,000	500,000	0	811,000
Annual cost of water	177,317	1,751,636	0	1,928,953
<b>Total allocated OM&amp;R costs</b>	10,030,971	4,326,874	743,636	15,101,481
Rounded values	10,000,000	4,300,000	700,000	15,100,000
<b>NTUA rates</b>				
Allocated OM&R costs – main system	12,594,137	2,977,044	846,194	16,417,375
Allocated OM&R costs – Gallup Regional	330,000	532,000	0	862,000
Annual cost of water	171,317	1,751,636	0	1,928,953
<b>Total allocated OM&amp;R costs</b>	13,101,454	5,260,681	846,194	19,208,328
Rounded values	13,100,000	5,300,000	800,000	19,200,000

Table F-11.—Present value of total costs (2007) (continued)

<b>Present value of total OM&amp;R costs by user</b>				
<b>CRSP rates</b>	<b>Navajo</b>	<b>City of Gallup</b>	<b>Jicarilla Apache Nation</b>	<b>Total</b>
Allocated OM&R costs— main system	\$210,482,000	\$40,512,000	\$20,843,000	\$271,837,000
Allocated OM&R costs – Gallup Regional	5,781,000	9,315,000	0	15,096,000
Cost of water	3,300,617	32,605,398	0	35,906,016
<b>Total allocated OM&amp;R costs</b>	219,563,617	82,432,398	20,843,000	322,839,016
Rounded values	220,000,000	82,000,000	21,000,000	323,000,000
<b>NTUA rates</b>				
Allocated OM&R costs – main system	267,447,000	58,117,000	23,717,000	349,281,000
Allocated OM&R costs – Gallup Regional	6,145,000	9,901,000	0	16,046,000
Cost of water	3,300,617	32,605,398	0	35,906,016
<b>Total allocated OM&amp;R costs</b>	276,892,617	100,623,398	23,717,000	401,233,016
Rounded values	277,000,000	101,000,000	24,000,000	401,000,000
<b>Present value of total capital and OM&amp;R costs by user</b>				
<b>CRSP Rates</b>	<b>Navajo</b>	<b>City of Gallup</b>	<b>Jicarilla Apache Nation</b>	<b>Total</b>
Capital	\$995,000,000	\$227,000,000	\$47,000,000	\$1,269,000,000
OM&R (including cost of water)	220,000,000	82,000,000	21,000,000	323,000,000
<b>Total all costs</b>	1,215,000,000	309,000,000	68,000,000	1,592,000,000
<b>NTUA rates</b>				
Capital	995,000,000	227,000,000	47,000,000	1,269,000,000
OM&R	277,000,000	101,000,000	24,000,000	401,000,000
<b>Total all costs</b>	1,272,000,000	328,000,000	71,000,000	1,670,000,000

Note: Present value of OM&R costs include fixed and variable OM&R costs incurred for partial water delivery before project completion.

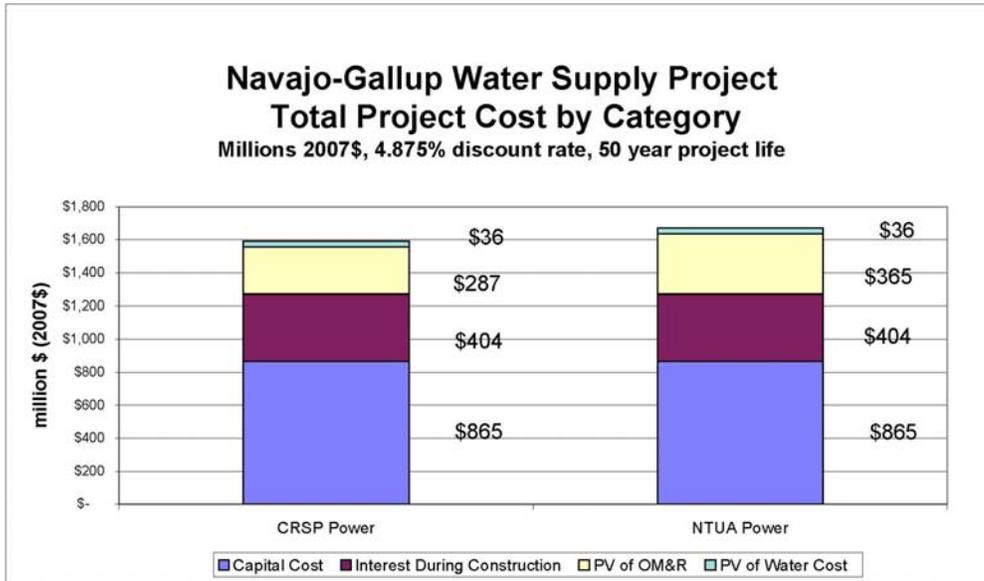


Figure F-6.—Total project cost by category.

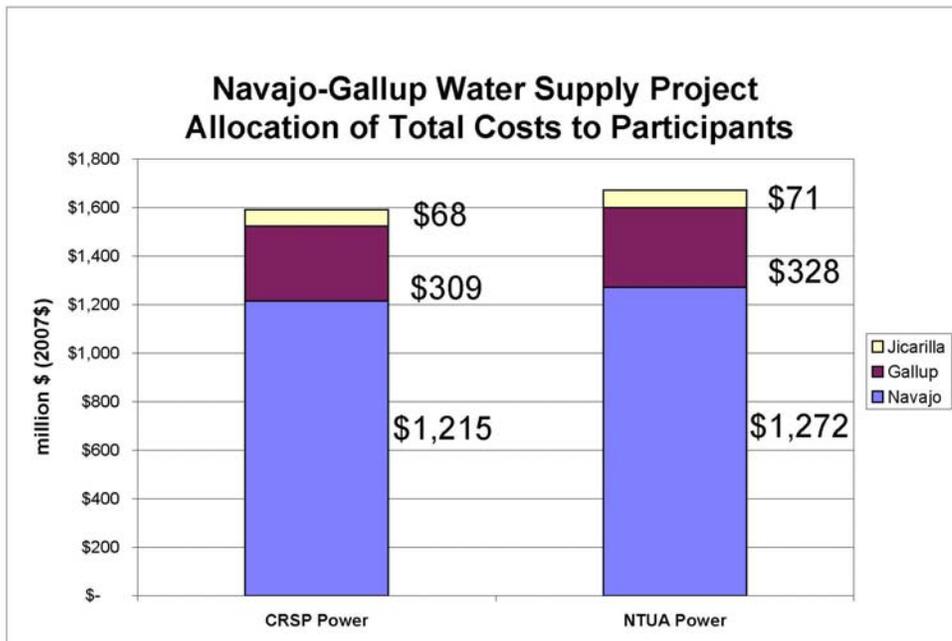


Figure F-7.—Allocation of total costs to participants.

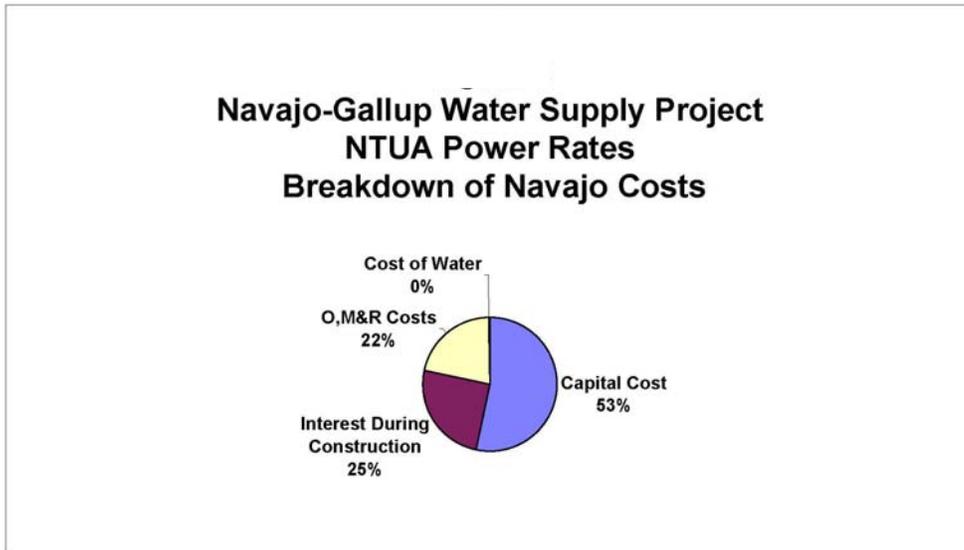


Figure F-8.—NTUA power rates (breakdown of Navajo costs).

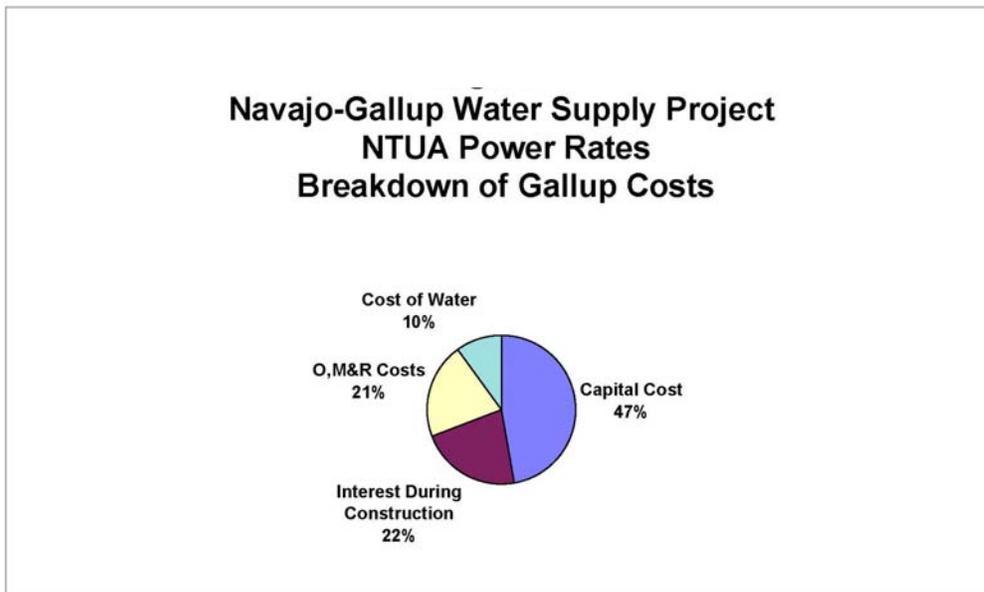


Figure F-9.—NTUA power rates (breakdown of Gallup costs).

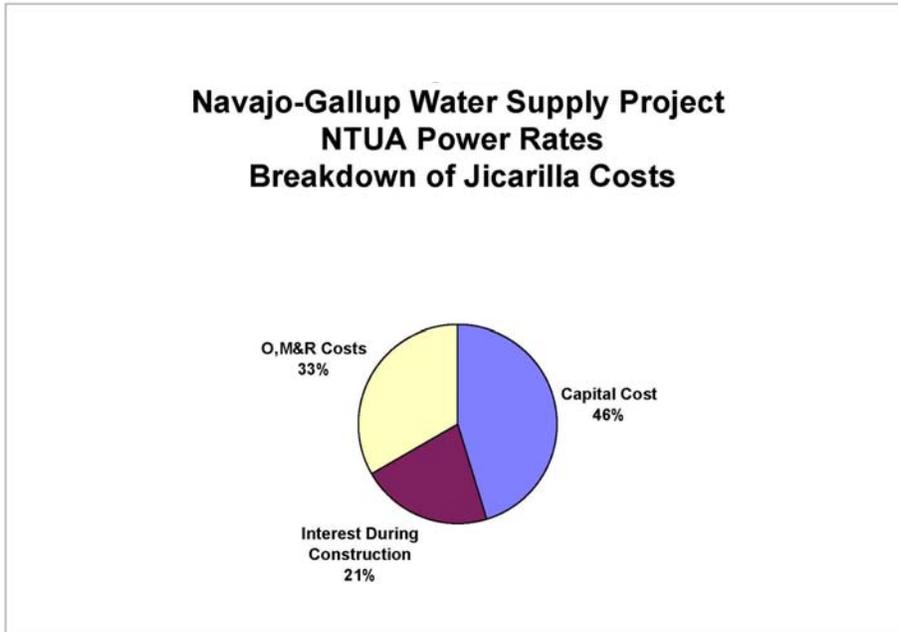


Figure F-10.—NTUA power rates (breakdown of Jicarilla costs).

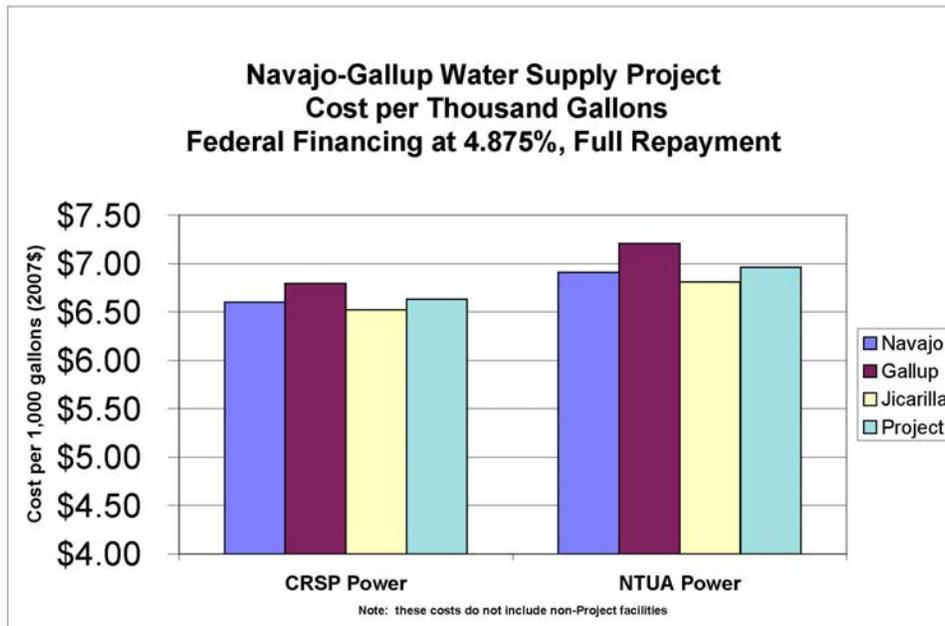


Figure F-11.—Cost per thousand gallons (Federal financing at 4.875%, full repayment).

- Exclusion of project cash costs that do not represent use of scarce national resources (use of otherwise unemployed people for construction workforce)
- Exclusion of project transfer payments that do not represent use of scarce national resources (taxes paid on construction spending)

The proposed project would principally benefit people in the northwest corner of New Mexico by providing water to which they otherwise would not have access or could only have access at a relatively higher cost. The measure of the benefits to the city of Gallup and to the Navajo Nation members who would be supplied by the proposed project is the willingness of these beneficiaries to pay for project water. The city of Gallup's willingness to pay was estimated from data on the current use of water by people in communities throughout the Mountain States. The Navajo people's willingness to pay was estimated from data on their spending for piped water service when available and on spending to haul water when no service is available.

Benefits to the Jicarilla Apache Nation were estimated from the cost of the next least expensive alternative source of water for the area of the reservation to be served by the proposed project. The Indian Health Service identifies the availability of a community water supply as critical for maintaining the health of Indian people. This report roughly estimates the indirect health benefits to Navajo people that would accrue from the provision of a clean water supply.

The completion of the water supply project would also provide infrastructure that is a necessary prerequisite to economic development and poverty relief on the reservations. While it is uncertain how much economic development would be encouraged by the proposed project, it is clear that the lack of a reliable water supply presently poses a significant constraint to most types of economic development. Table F-12 summarizes the economic costs and benefits associated with the proposed project. The details of this analysis are presented in volume II, appendix D.

## **Ability to Pay**

Ability to pay in a water supply context refers to the affordability of a water system. A common measure of ability to pay for water services is utility payments as a percent of median household income (EPA Prioritizing Drinking Water Needs, 1999). The EPA, for example, uses 2.5 percent of median household income (MHI) to determine whether water treatment options to comply with clean water standards are affordable and should be required.

Table F-12.—Summary of project economic benefits and costs  
(million 2007\$, 4.875% discount rate)

	Direct	Direct plus other
<b>Benefits</b>		
Gallup willingness to pay	361	361
Navajo willingness to pay	1,448	1,448
Jicarilla avoided cost	57	57
Construction employment	231	231
Indirect and induced employment	0	111
Health benefits	0	435
Reverse outmigration	0	+
Economic development	0	+
<b>Total benefits</b>	2,137	2,683
<b>Costs</b>		
Project construction	1,192	1,192
Distribution system construction	48	48
OM&R	368	368
Gallup water cost	33	33
Navajo water cost	24	24
Power generating cost	19	19
Salinity increase cost	20	20
<b>Total costs</b>	1,704	1,704
<b>Benefit/cost ratio</b>	1.25	1.57

*Note:* The benefit/cost ratio greater than 1.0 indicates that the anticipated project benefits are greater than cost and, thus, that the proposed project represents a beneficial use of national resources.

Legislation proposed in the 109<sup>th</sup> Congress allows the Secretary to determine the Federal share of construction costs based on an analysis of per capita income, MHI, poverty rate, ability to raise revenues, the strength of the balance sheet, and the existing cost of water, all relative to regional averages (109S 897, Section 106(f) (2)); however, the bill does not specify any threshold for these measures.

Given this lack of a basis for determining affordability, it may be useful to show the average percentage of MHI that the project participants would pay for water under various assumptions about the respective participant's share of capital cost. These percentages are determined by dividing the estimated annual household cost of project water to the MHI shown in table F-13.

Table F-13.—Median household income

	Navajo Nation	City of Gallup	Jicarilla Apache Nation
1999 median household income (1999\$)	20,005	34,868	26,750
2005 median household income (2005\$)	23,807	41,247	30,620

Source: 1999 MHI from U.S. Census Bureau, “2000 Census of Population and Housing” indexed to 2005\$ with U.S. Bureau of Labor Statistics, “Consumer Price Index,” annual growth rates from U.S. Census Bureau, “1990 Census of Housing” and “2000 Census of Population and Housing,” Dornbusch and Associates.

The affordability percentages for different levels of participant capital cost repayment are shown by adjusting the capital portion of the levelized cost. Figure F-12 shows these affordability percentages for capital repayment ratio scenarios ranging from 0 percent repayment to 100 percent. Finally, figure F-12 also compares these affordability percentages to the benchmark 2.5 percent of MHI. These benchmarks are based on EPA judgments of the affordable portion of household income used to pay for a water supply.

Figure F-12 shows that all three project participants could pay project OM&R and a portion of the capital costs without exceeding the EPA threshold of 2.5 percent.

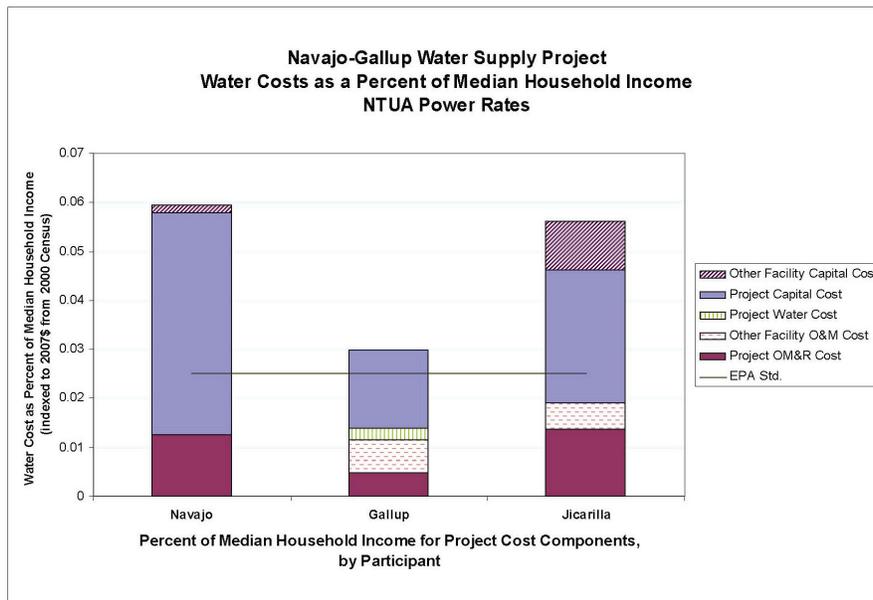


Figure F-12.—Water costs as a percent of median household income (NTUA power rates).