

APPENDIX D

Part III

Financial and Repayment Analysis

**FINANCIAL AND REPAYMENT ANALYSIS
NAVAJO – GALLUP WATER SUPPLY PROJECT**

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I. Executive Summary

This report is one of a series of reports concerning economic issues pertaining to the Navajo Gallup Water Supply Project. While another report addresses the *economic* benefits and costs of the Project, this report deals with the Project's *financial* or cash costs. Specifically, the report discusses the capital costs, operation, maintenance and replacement costs, cost of water, and non-Project cash costs that each participant must pay to deliver water to their users. The costs are averaged over the projected water deliveries during the life of the Project to determine a levelized cost, or the constant cost (in 2005\$) per thousand gallons that would repay all Project costs if charged on all Project deliveries. Table EX-1 shows this levelized cost for all participants.

	Navajo	Gallup	Jicarilla	Project Total
Total Levelized Cost	\$6.74	\$8.02	\$7.94	\$6.98

Several federal programs are available to assist in financing rural and small community water projects. The Department of Agriculture and Environmental Protection Agency both have programs that distribute annual appropriations to qualifying projects. Unfortunately, neither program appears to be a good fit for the Navajo Gallup Water Supply Project.

Although the Bureau of Reclamation has no program to distribute annual appropriations to projects it is designated by Congress to assist in planning, constructing and funding water projects that are specifically approved by legislation. We conducted a review of the capital costs of other projects that have either been approved by Congress or are in the planning stages. The Navajo Gallup Water Supply Project capital costs per person served and per acre-foot delivered are both at the lower end of the range represented by these other projects. When the available information on annual operation and maintenance costs are included, Navajo-Gallup Water Supply Project is still within the range of other western U.S. projects, but at the upper end.

Some agency funding programs assess the affordability of community Project costs, and often the programs will provide more assistance if the costs exceed some threshold of affordability. The most common measure of affordability is cost as a percent of median household income, and by that measure the operation, maintenance and water costs for all three Project participants would fall below the EPA threshold, but exceed that threshold once all Project capital costs are added.

II. Introduction

This report focuses on the *financial* costs of the Navajo Gallup Water Supply Project and how those costs might be paid. The report is a companion to three other reports that address different economic aspects of the Project: (1) “Navajo-Gallup Water Supply Project, Allocation of Capital and OM&R Costs Among Project Participants, San Juan River – PNM Alternative,” (2) “Economic Benefit/Cost Analysis, Navajo-Gallup Water Supply Project,” and (3) “Navajo-Gallup Water Supply Project, Socioeconomic Impacts.”

The financial analysis estimates the cash cost of the Project and determines what the overall cost per thousand gallons would be for Project participants, under different financing scenarios. The financing alternatives considered include various assumptions about the degree to which the Project may be subsidized by the federal government.

III. Financial Analysis of Project Costs

A. Financial costs

In this report the term “financial analysis” refers to the compilation of Project cash costs assigned to the Project participants. The financial analysis differs from the economic analysis in the “Economic Benefit/Cost Analysis” report in two important respects. First, the financial analysis focuses on cash flow, excluding non-cash costs such as the opportunity cost of Project water used by the Navajo Nation and Jicarilla Apache Nation, and including cash costs that do not represent a use of economic resources, such as the projected Project-associated tax expenditures. Second, the financial analysis focuses on the projected costs incurred by the Project participants, excluding costs that may be borne by non-participants, such as the loss of downstream power generation capability. Please refer to Chapter B of the “Economic Benefit/Cost Analysis” report [Merchant, 2005a] for a more complete discussion of the differences between the financial and economic analysis frameworks.

B. Project financial costs

1. Capital costs

The Project’s financial costs include both costs for (1) the main system of pipelines, treatment plants and storage tanks, and (2) the facilities build in and around Gallup to distribute Project water. The total cost for these facilities is expected to be \$715 million (2005\$). In addition, because most of the capital investment will be incurred before Project completion, interest during construction will add an additional \$288 million (2005\$) for which Project participants will also be responsible, assuming full repayment of Project costs. These costs include all construction, right-of-way acquisition, environmental mitigation, cultural resource investigations and taxes [Merchant, 2005b].

The estimated Project construction and interest costs are translated to a constant annual amount by amortizing those costs over the anticipated life of the Project using the current federal discount rate for water projects of 5.375% per year. Then the annual amortized amount is divided by the annual equivalent amount of water deliveries to determine the levelized rate per thousand gallons needed to repay those costs. In this report the term "levelized cost" refers to a constant rate per thousand gallons (in 2005\$), which if applied to all water delivered would repay the capital, interest, OM&R, water and other utility costs over the life of the Project.¹ This rate is calculated by discounting the costs to be paid and all water to be delivered by the same discount rate (5.375% in this report), and dividing the first by the second. Table 1 shows how the levelized rate to repay capital costs is calculated.

Table 1				
NAVAJO-GALLUP WATER SUPPLY PROJECT				
LEVELIZED CAPITAL COST / THOUSAND GALLONS				
50 year Project Life, Federal Financing at 5.375%, 2005\$				
	Navajo	Gallup	Jicarilla	Project Total
Present Value of Capital Costs	\$790,000,000	\$176,000,000	\$37,000,000	\$1,003,000,000
Annual Amortization of Capital Costs	\$45,804,685	\$10,204,588	\$2,145,283	\$58,154,556
Annual Equivalent Water Deliveries (1,000 gal.)	8,950,913	2,443,890	641,777	12,036,580
Levelized Cost/Thousand Gallons	\$5.12	\$4.18	\$3.34	\$4.83

2. Operation, Maintenance and Replacement (OM&R) costs

Following its construction, the Project will incur both fixed and variable OM&R costs. The fixed costs include staff salaries, intake dredging, annual maintenance and equipment replacement. Variable costs include energy and chemical costs. The distinction is important because while the fixed costs are assumed constant (in 2005\$) over time, the variable costs will increase in conjunction with increases in water use. We calculate the total present value of the Project's OM&R costs to be \$283 million (2005\$), using a 5.375% discount rate and energy rates provided by the Navajo Tribal Utility Authority.

¹ Levelized cost is calculated by dividing the present value of costs by the levelized annual water delivery. The levelized annual water delivery is that constant annual delivery of water that over the 50 year project life has the same present value as the anticipated actual water deliveries (which may change over time and in some cases begin before the 50 year project period).

Table 2 shows how this OM&R cost is allocated among project participants and calculates the levelized rate needed to pay this cost.

Table 2				
NAVAJO-GALLUP WATER SUPPLY PROJECT				
LEVELIZED O,M&R COST / THOUSAND GALLONS				
NTUA Rates for Energy, 50 year Project Life, 5.375%, 2005\$				
	Navajo	Gallup	Jicarilla	Project Total
Present Value of O,M&R Costs	\$209,799,000	\$52,951,000	\$20,967,000	\$283,717,000
Annual Amortization of O,M&R Costs	\$12,164,275	\$3,070,132	\$1,215,680	\$16,450,086
Annual Equivalent Water Deliveries (1,000 gal.)	8,950,913	2,443,890	641,777	12,036,580
Levelized Cost/Thousand Gallons	\$1.36	\$1.26	\$1.89	\$1.37

3. Cost of water

Both the Navajo Nation and the Jicarilla Apache Nation presently have rights to water they intend to use in the Project. The terms of the Jicarilla Water Rights Settlement Act exempt the Jicarillas from paying any cash cost for water from Navajo Reservoir, the source for Project water. In the absence of a similar settlement the Navajo Nation will pay a levelized cost to the Bureau of Reclamation estimated to be \$4.12 per acre-foot. The City of Gallup will have to pay for obtaining water from a water rights owner. The present value of a tentative purchase arrangement is \$20 million (2005\$). Table 3 shows how this cost translates to the levelized rate needed to cover the projected payments for water.

Table 3				
NAVAJO-GALLUP WATER SUPPLY PROJECT				
LEVELIZED WATER COST / THOUSAND GALLONS				
50 year Project Life, Federal Financing at 5.375%, 2005\$				
	Navajo	Gallup	Jicarilla	Project Total
Present Value of Water Costs	\$2,950,140	\$19,758,536	\$0	\$22,708,677
Annual Amortization of Water Costs	\$171,051	\$1,145,612	\$0	\$1,316,663
Annual Equivalent Water Deliveries (1,000 gal.)	8,950,913	2,443,890	641,777	12,036,580
Levelized Cost/Thousand Gallons	\$0.02	\$0.47	\$0.00	\$0.11

4. Continuing utility costs

The Navajo Nation, the City of Gallup and the Jicarilla Apache Nation will all incur costs separate from the Project to build distribution systems and/or operate their water systems. These costs will presumably be paid by the customers of each utility, and the costs are therefore appropriate to include in future rate calculations. The Navajo costs include the amortized cost of constructing distribution lines to deliver the Project water to various Navajo Chapters. Gallup costs are those costs to operate the City system that will continue even after the Project is constructed. These Gallup costs do not include the cost of operating wells that will be shut down when the Project begins delivering water. The Jicarilla costs included here are those needed to construct and operate a distribution system serving on the commercial and residential (not industrial) users of their water allocation. Table 4 summarized these other costs and calculates the levelized rate needed to pay them.

Table 4				
NAVAJO-GALLUP WATER SUPPLY PROJECT				
LEVELIZED OTHER COST / THOUSAND GALLONS				
50 year Project Life, Federal Financing at 5.375%, 2005\$				
	Navajo	Gallup	Jicarilla	Project Total
Annual Amount of Other Costs - Capital	\$2,203,000		\$290,000	\$2,493,000
Annual Amount of Other Costs - O&M		\$5,183,284	\$150,000	\$5,333,284
Annual Equivalent Water Deliveries (1,000 gal.)	8,950,913	2,443,890	162,926	11,557,729
Levelized Cost/ TG - Capital	\$0.25		\$1.78	\$0.22
Levelized Cost/ TG - O&M		\$2.12	\$0.92	\$0.46
Note: Jicarilla other costs are for commercial and residential users only				

5. Summary of levelized rate

Table 5 summarizes the various cost components for each participant and for the Project as a whole, and shows the levelized rate per thousand gallons needed to pay all the financial costs.

Table 5 NAVAJO-GALLUP WATER SUPPLY PROJECT SUMMARY OF LEVELIZED COST / THOUSAND GALLONS 50 year Project life, Federal Financing at 5.375% and NTUA Rates for Energy, 2005\$				
	Navajo	Gallup	Jicarilla	Project Total
Capital Cost	\$5.12	\$4.18	\$3.34	\$4.83
OM&R Cost	\$1.36	\$1.26	\$1.89	\$1.37
Water Cost	\$0.02	\$0.47	\$0.00	\$0.11
Other Cost - Capital	\$0.25	\$0.00	\$1.78	\$0.22
Other Cost - O&M	\$0.00	\$2.12	\$0.92	\$0.46
Total Cost	\$6.74	\$8.02	\$7.94	\$6.98

IV. Federal and State Programs Available to Assist in Project Financing

Many water projects in the rural West have been funded through government programs, both federal and state. The eligibility criteria for Indian tribes generally differ from those for non-Indian projects, so the two cases will be discussed separately.

A. Non-Tribal Water Supply Projects

The United States Department of Agriculture (USDA), Environmental Protection Agency (EPA), and Bureau of Reclamation (BOR) are the primary federal agencies responsible for funding water supply projects in small towns and rural areas. While the BOR builds or supervises construction of water projects at the direction of Congress, USDA and EPA have programs that fund water project construction in communities that meet program criteria.

The USDA's Rural Utility Service (RUS) provides rural communities with loans and grants for water project construction. The RUS distributes funds in direct loans, guaranteed loans, and grants through the Water and Waste Disposal for Rural Communities program. Total program funding has declined from the \$2.1 billion in FY 2002 to about \$1.5 billion in FY 2003, 2004 and 2005 [USDA, 2005a and 2005b]. These funds are allocated to each state using a formula that takes into account each state's share of national rural population, national rural population with incomes below the poverty level, and national nonmetropolitan unemployment [USDA, 1999]. In FY 2003 New Mexico was allocated \$830,000 in funds for guaranteed loans, \$7,416,000 in funds for direct loans and \$3,947,000 in funds for grants [USDA, 2005b]. USDA criteria for participation include economic feasibility, population limits, and need. Except in the case of grants awarded to low-income² communities, all USDA funds must be repaid [USDA, 1999, Section 1780.10(b)(2)].

The EPA's Drinking Water State Revolving Fund (DWSRF) provides states with capitalization grant funds for loans. These funds are loaned by states to public and non-profit water systems

² Grant funds cannot be used to pay any costs of a project when the median household income exceeds the non-metropolitan median household income of the State.

within their respective states. The DWSRF funding for FY 2005 was \$843 million and is expected to be \$835 million in FY 2006 [EPA, April, 2005 and 2005b]. New Mexico's share was \$8,285,000 in FY 2005 and is tentatively \$8,352,500 in FY 2006 [USEPA, 2005a and 2005b]. New Mexico adds 20% of the federal contributions as matching funds, so the total available funding is slightly in excess of \$10 million annually. Each state develops its own criteria for participation in the DWSRF program. The criteria for New Mexico are based on public health risk, environmental factors, affordability and capacity development factors [New Mexico Finance Authority, "Fund"]. With the exception of grants awarded based on need, all DWSRF funds must be repaid. Interest rates are applied in three tiers: (1) communities not qualifying as "disadvantaged"³ pay 3% annual interest; (2) communities with median household income (MHI) less than 90% of State MHI and with an affordability ratio between 1.0% and 1.5% pay 0% interest, and (3) communities with MHI less than 90% of State MHI and an affordability ratio greater than 1.5% receive assistance in planning, design and engineering services, extension of loan repayment period, or forgiveness of principal sufficient to bring their affordability ratio down to 1.5%. New Mexico treats 1.5% as the maximum affordability ratio that a disadvantage community should bear [New Mexico Finance Authority, "Program"].

The BOR does not presently have a program for funding water projects. On the other hand, BOR is often delegated authority by Congress to construct or oversee projects. Because BOR has no ongoing program, it has not established any formal eligibility criteria. However, long-standing BOR policy supports full-reimbursement plus interest. Section 9 of the 1939 Reclamation Project Act requires that projects authorized or built pursuant to Federal reclamation laws repay at least their annual operation and maintenance cost [U.S.Congress]. Legislation pending before the current Congress would establish some criteria for BOR review of rural water projects and recommendation by the Secretary of the Interior for Congressional funding [U.S. Senate, 109 S. 895]. The legislation, as proposed, would allow up to 75% federal cost sharing of construction costs. This legislation, however, would not establish any separate funding mechanism for water projects – any recommended projects would still need Congressional authorization and appropriations.

The Non-Tribal assistance criteria for the USDA, EPA, and BOR are summarized in Table 7. The Table shows that the Navajo Gallup Water Supply Pipeline is not a good fit for any of the programs. The USDA's RUS program requires that a project serve only communities of fewer than 10,000 people, while Gallup alone has a population approximately double this size. BOR does not have an ongoing program to fund water projects, so Project participants would have to secure Congressional authorization to obtain BOR sponsorship – they cannot apply directly to the BOR. Most significantly, both the RUS program and the EPA's DWSRF program are inadequate in scale to use as principal funding sources for the Project. The Project's initial capital cost of \$715 million far exceeds the recent program funds that have been made available for water projects in New Mexico.

³ "Disadvantaged" is defined as having median household income less than 90% of the State average and having an affordability ratio of at least 1.0%, where the affordability ratio is calculated as the ratio of the cost of water service to the median household income.

Table 7

Federal Assistance Funding Criteria For Non-Tribal Water Supply Projects

Agency	USDA	EPA	BOR (1)
Population	Population of town cannot exceed 10,000	At least 15% of state fund must be used yearly for projects serving no more than 10,000	Population of community not more than 50,000
Project Type	Construction, enlargement, extension or improvement of water supplies	Drinking water infrastructure project that bring existing water systems in compliance with the Safe Drinking Water Act or address public health problems	Planning, evaluation and construction of rural water supply projects
Applicant Type	Public entity; not-for-profit organization, or Indian tribe	Community water systems and publicly or privately owned or nonprofit community water systems	State, regional or local authority, including Indian tribes and public districts
Applicant Eligibility	Applicant must have legal authority and responsibility to undertake the project, operate and maintain the proposed facility, and meet the financial terms of the project.	Applicant must be able to repay the loan.	
Cost Sharing Criteria	Project must be economically feasible with regard to repayment, 75% maximum federal cost share.	100% repayment with interest, although States can allow subsidized interest and/or principal forgiveness to disadvantaged communities.	Project must be economically feasible with regard to repayment, 75% maximum federal cost share, based on capability to pay. Locals must pay 100% OM&R.
Growth Considerations	Designed to meet the needs of present or projected population	Project cannot be intended primarily for growth, but may meet needs for reasonable growth over its life.	Project can address future water supply needs
State Requirements		States must prioritize projects on basis of health risk, clean water standards, and need.	
Recent annual funding in N.M	\$12 million	\$10 million (including State contribution)	NA
Service Area	National	National	17 Western States

(1) BOR Program is proposed in 109 S. 895. BOR does not currently have a formal program.

Sources: General Accounting Office. *Federal Assistance Criteria Related to the Fort Peck Reservation Rural Water Project, June 1998; 109 S. 895.*

B. Tribal Water Supply Projects

USDA does not have special criteria for tribal water projects.

EPA and BOR criteria for funding tribal water supply projects differ significantly from criteria for non-tribal water supply projects. Whereas both the EPA and the BOR historically have expected full repayment for non-tribal projects, tribal projects are not expected to repay funds. The primary EPA program for funding tribal water supply projects is the DWSRF Tribal Set Aside. The BOR presently does not have a formal policy regarding funding or cost share. However, as with non-tribal projects, there has been an informal funding policy, which in the case of tribal water projects has been full federal funding. Legislation pending in the current Congress would allow the Secretary of the Interior to consider deferring all tribal construction costs if warranted based on an assessment of tribal capability to repay costs [109 S. 895].

Tribal assistance criteria for the USDA, EPA, and BOR are summarized in the Table 8, below. While both the Navajo Nation and Jicarilla Apache Nation would apparently qualify for both EPA and BOR funding, the EPA funds are inadequate to contribute substantially to the Navajo Gallup Project, and BOR funding is obtained only through specific Congressional authorization, as discussed in the next section.

Table 8

Federal Assistance Funding Criteria For Tribal Water Supply Projects

Agency	USDA	EPA	BOR (1)
Special Tribal Criteria	None	1.5% Tribal set-aside	Repayment of construction costs may be deferred.
Project Type	Construction, enlargement, extension or improvement of water supplies	Drinking water infrastructure project that bring existing water systems in compliance with the Safe Drinking Water Act or address public health problems	Planning, evaluation and construction of rural water supply projects
Applicant Type	Indian tribes are eligible	Indian tribes are eligible	Indian tribes are eligible
Applicant Eligibility	Applicant must have legal authority and responsibility to undertake the project, operate and maintain the proposed facility, and meet the financial terms of the project.	Applicant must be able to repay the loan.	
Cost Sharing Criteria	Project must be economically feasible with regard to repayment, 75% maximum federal cost share.	100% federal funding	Up to 100% federal funding

Table 9 - Western Municipal Water Projects Funded by Congressional Authorization

Project	General		Demographics		Capital Cost (2005\$)				OM&R Cost		Bill or Statute (a)		
	State	Water Delivered (afy)	Pop Served	% Indian	per pers. served	per af	total (million \$)	cost share split fed/non-fed	Interest During Construction	OM&R Cost share fed/non-fed	Preference Power authorized	introduced	enacted
Lewis and Clark Rural Water System (b)	SD, MN, IA	25,763	200,000	0%	\$2,115	\$16,419	\$423	80/20, with the exception of Sioux Falls, Sioux Falls - 50/50 split of incremental cost		0/100			PL106-246
Mid Dakota (c)	SD	4,481	32,000	4%	\$4,938	\$35,263	\$158	\$100 million federal funding of \$147 million project, up to 85% grant	forgiven		yes		PL102-575 Title XIX
Mni Wiconi (d)	SD	14,563	50,000	75%	\$8,616	\$29,581	\$431	non tribal - 80/20 tribal - 100			yes		PL103-434
Rocky Boy North Central Montana Water System (e)	MO	8,000	31,000	10%	\$8,913	\$34,538	\$276	non tribal - 80/20 tribal - 100		all (core) 100/0 non-tribal 0/100 (non-core)	yes		PL106-163 PL107-331
WEB Rural Water Development Project (f)	SD	4,604	14,763	0%	\$12,057	\$38,664	\$178	80/20					PL100-490
Animas La Plata (g)	CO, NM	57,100	70,190	2%	\$7,437	\$9,142	\$522	non-tribal - 0/100 tribal - 100 feds pay 100% of design and env.		all 0/100			PL106-554
Southwest Pipeline Project (h)	ND	3,109	35,000	0%	\$5,286	\$59,503	\$185	75/25				99 HR 1116 106 S 623	
Perkins County (i)	SD	460	2,500	0%	\$12,000	\$65,164	\$30	75/25			yes		PL106-136
Fort Peck Reservation Rural Water System (j)	MO	6,000	28,000	36%	\$7,536	\$35,167	\$211	non-tribal 76/24 tribal - 100		non-tribal 0/100 tribal 100/0	yes.		PL104-300 PL106-382
Fall River Water Users District Rural Water System (k)	SD	118	660	0%	\$7,493	\$41,810	\$5	70/30			yes.		PL105-352
Jicarilla Apache Reservation Rural Water System (l)	NM			100%			\$45 mil. (federal)	specific items allocated to feds and tribe					PL107-331

Notes:

(c) There is no Indian component in authorization, but Crow Creek reservation is inside service boundaries.

Maximum federal funding for project is a dollar amount ceiling, not a percentage. Maximum grant for federal share is 15%.

(f) WEB Water was unable to provide Population Served. Population Served calculated using number of hook-ups provided by WEB Water and number of persons per household provided by 1990 U.S. Census

(g) Population served has not been formally determined. Population numbers are estimated based on population of prospective service area and USBR informal estimates.

Tribal Population is based on number of Ute Indians.

Source:

(a) www.thomas.gov

(b) Pam Bonrud, Lewis and Clark Rural Water System

(c) Tribal Population from Department of Commerce, Economic Development Administration, all other information from Kurt Pheifle, Mid Dakota Rural Water District

(d) Mike Curly, Lyman Jones Rural Water System

(e) Tribal Population from Chippewa Creek Tribal Council, all other information from Anne-Marie Robinson, Bear Paw Development

(f) Laurie Swallow, WEB Water

(g) Pat Shumacher, USBR; Rege Leach, USBR

(h) Pinkie Evanscurry, Southwest Pipeline

(i) Dave Ryan, State of South Dakota Department of Environment and Natural Resources

(j) Clint Jacobs, Dry Prairie Rural Water Authority

(k) PL105-352

(l) PL107-331

Capital cost and population served updated from Federal Reserve Bank of Minneapolis, "Fedgazette," Sept., 2005, www.minneapolisfed.org/pub/fedgaz/05-09/table.cfm.

Table 10 - Proposed Western Municipal Water Projects

Title	General		Demographics		Capital Cost (2005\$)				OM&R Cost		Bill or Statute (a)		
	State	Water Delivered (afy)	Pop Served	% Indian	per pers. served	per af	total (million \$)	cost share split fed/non-fed	Interest During Construction	OM&R Cost share fed/non-fed	Preference Power authorized	introduced	enacted
Lake Powell - St. George Pipeline (a)	UT	100,000	200,000	0%	\$2,500	\$5,000	\$500						
Southern Delivery System (b)	CO	87,000	32,000	0%	\$31,575	\$11,614	\$1,010						
Northern Integrated Supply Project ©	CO	35,700	50,000	0%	\$7,904	\$11,070	\$395						
St. Mary Canal (d)	MT	2,509	14,000	NA	\$8,571	\$47,825	\$120						
Southern Black Hills Water System (e)	SD	3,405	19,000	NA	\$4,211	\$23,493	\$80						
South Central Regional Water System (f)	ND	2,420	13,500	NA	\$5,481	\$30,585	\$74						
Fort Berthold Rural Water Supply System (g)	ND	3,307	9,866	100%	\$12,099	\$36,095	\$119						
Eastern New Mexico Rural Water System (h)	NM	24,000	133,911	0%	\$2,009	\$11,209	\$269	80/20		0/100		108 S. 2513	
Red River Valley Water Supply Project (i)	ND	NA	480,000 to 566,000	NA	\$972 to \$4,583	NA	550 to 2,200					106 S. 623	PL106-541
Navajo Gallup Water Supply Project (j)	NM - AZ	37,600	209,794	80%	\$3,482	\$19,431	\$731						

Notes:

(h) population served estimated from water deliveries based on 160 gpcd

(d)(e)(f) water use estimated from population based on 160 gpcd

Source:

(a) "Water Strategist," July/August, 2005

(b) Colorado Springs Utilities, "Southern Delivery System Fact Sheet," May, 2005.

(c) MWH Americas, Inc., "Northern Integrated Supply Project, Phase II Alternative Evaluation," Jan., 2004.

(d) Federal Reserve Bank of Minneapolis, "Fedgazette," Sept., 2005, www.minneapolisfed.org/pub/fedgaz/05-09/table.cfm.

(e) Federal Reserve Bank of Minneapolis, "Fedgazette," Sept., 2005, www.minneapolisfed.org/pub/fedgaz/05-09/table.cfm.

(f) Federal Reserve Bank of Minneapolis, "Fedgazette," Sept., 2005, www.minneapolisfed.org/pub/fedgaz/05-09/table.cfm.

(g) MSE-HKM, Inc., "Discussion of recent Large Scale Municipal, Rural and Industrial (MR&I) Water Projects," Dec. 8, 1999.

(h) 108 S. 2513

(i) Federal Reserve Bank of Minneapolis, "Fedgazette," Sept., 2005, www.minneapolisfed.org/pub/fedgaz/05-09/table.cfm.

(j) James P. Merchant, "Navajo-Gallup Water Supply Project, Allocation of Capital and O,M&R Costs Among Project Participants, San Juan River - PNM Alternative," Sept. 26, 2005.

Project costs indexed from Jan., 2005\$ (\$715 million) to July, 2005\$ (\$731 million) to match period for costs for other projects.

Growth Considerations	Designed to meet the needs of present or projected population	Project cannot be intended primarily for growth, but may meet needs for reasonable growth over its life.	Project can address future water supply needs
Recent annual national funding	\$16 million	\$13 million	NA
Service Area	National	National	17 Western States

(1) BOR Program is proposed in 109 S. 895. BOR does not currently have a formal program.

Sources: General Accounting Office. *Federal Assistance Criteria Related to the Fort Peck Reservation Rural Water Project, June 1998; 109 S. 895.*

C. Congressional Project Authorization

Projects that do not meet the criteria of established funding programs can seek Congressional authorization. Because the authorization is project-specific there are no formal guidelines on determining whether a project qualifies or the terms of funding once awarded. However, many of the recent Western rural water projects funded by Congress have some similar characteristics. Table 9 shows that the federal share of construction costs for non-Indian projects has typically ranged from 70 to 80 percent, while the federal share of construction costs for Indian projects has normally been 100 percent. While all non-Indian projects have been expected to pay 100 percent of OM&R costs, the Indian projects sometimes pay zero percent and sometimes pay 100 percent.

Table 10 shows how the Navajo-Gallup Water Supply Project compares to other water projects being proposed in the West. None of these projects has received Congressional approval for construction, so the terms of any approval are still pending. However, the table does show the relative size of the projects in terms of population served, water supply developed and cost. Figures 1 and 2 compare these proposed projects on a cost per person served and a cost per acre-foot of capacity basis.

Tables 9 and 10, and Figures 1 and 2, compare only the capital costs of various water projects. Operation and maintenance (O&M) costs are not readily available for most of these projects. Table 11 shows the total levelized cost per thousand gallons (\$/TG) for some western projects for which O&M costs were available.

Project	Capacity (afy)	Cost / TG
Albuquerque	97,000	\$1.32
Lewis & Clark	25,760	\$5.56
Navajo-Gallup Water Supply Project	37,550	\$6.98
Rocky Boys/North Central Montana Regional Water System	8,802	\$8.32
Santa Fe	8,730	\$5.58

Sources: Stomp, Carpenter, HKM, Banner, Dombusch Associates.

Figure 1
 Western United States Water Projects
 Capital Cost per Person Served (2005\$)

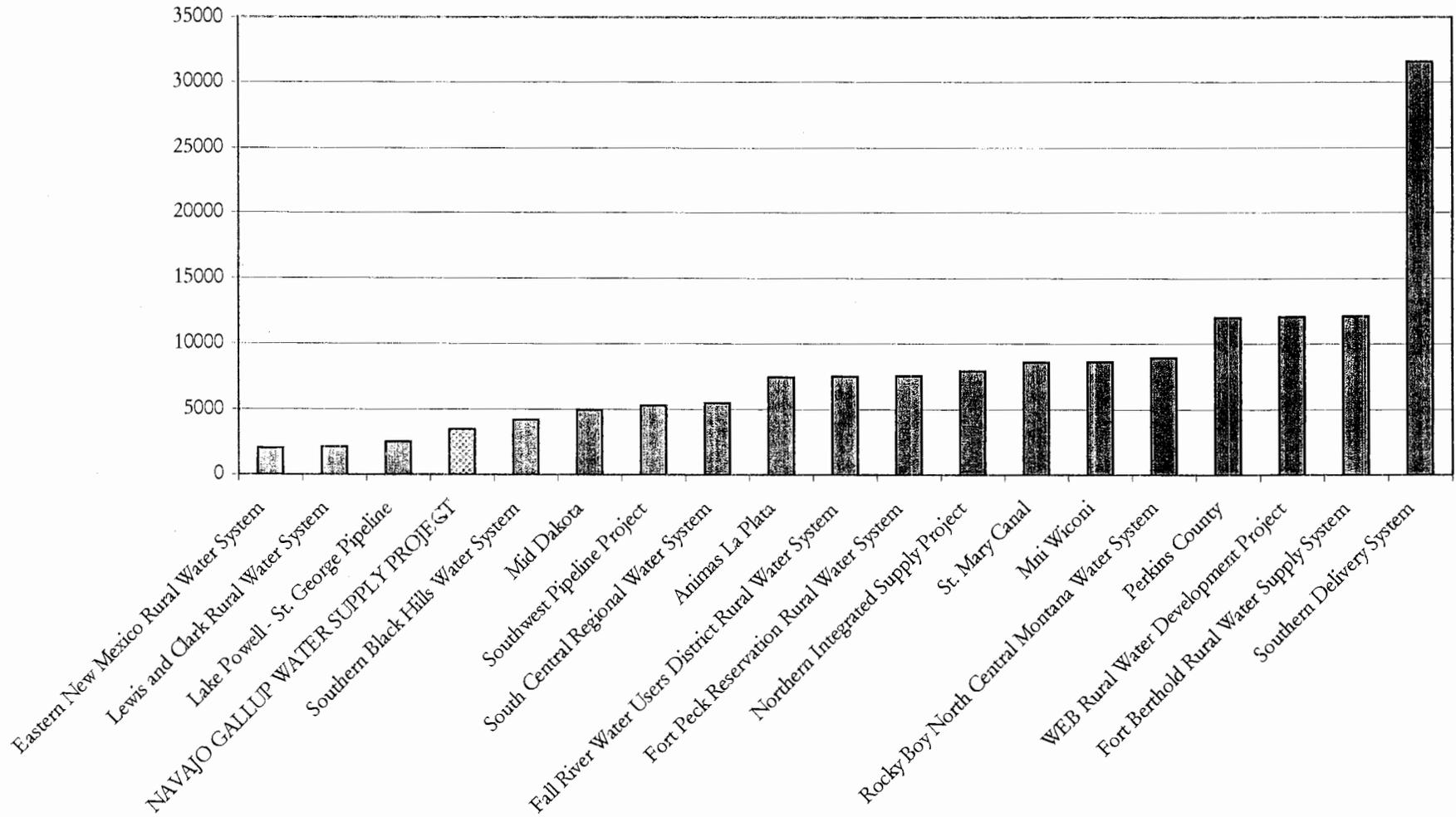
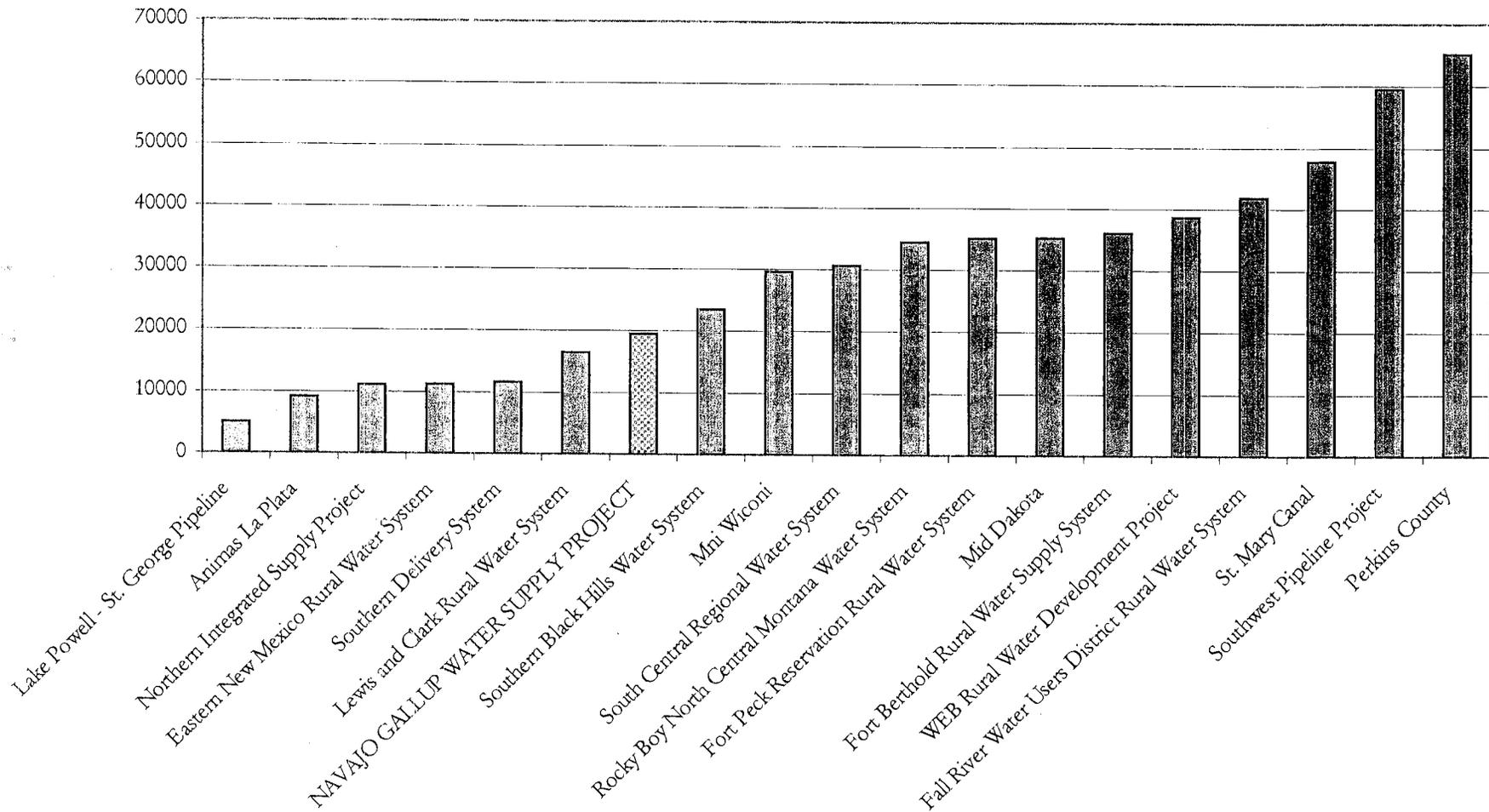


Figure 2
Western United States Water Projects
Capital Cost per Acre-Foot of Capacity (2005\$)



V. Ability to Pay

Some of the funding programs discussed above use “affordability ratios” [NMFA] or “capability to pay” measures [109 S. 895]. These concepts are commonly referred to as the ability of water users to pay for their water service, or in short, the “ability to pay” issue.

Ability to pay in a water supply context refers to the affordability of a water system. The Asian Development Bank, for example, explains “ability-to-pay” as “[t]he affordability or the ability of the users to pay for the water services, as expressed by the ratio of the monthly household water consumption expenditure to the monthly household income.” [ADB, p. 362] This ability to pay concept is used by some programs as a threshold which once surpassed triggers additional assistance or as a limit on how much of project’s costs a beneficiary should pay. Although it appears that the available funding programs are either inadequately funded or inappropriate for the Navajo Gallup Water Supply Project, it may be useful to review how the ability to pay is used by these programs and by other agencies. If the Project participants seek Congressional funding, for example, Congress may be interested in knowing the affordability of the Project costs.

The most common measure of ability to pay for water services is utility payments as a percent of median household income. [EPA, 1999(b), p. 93] EPA, for example, uses 2.5% of median household income (MHI) in determining whether water treatment options to comply with clean water standards are affordable and should be required. EPA selected 2.5% of median household income as an affordability threshold based on their analysis of consumer spending on discretionary goods (alcohol and tobacco = 1.5% of MHI), on other utilities (telephone = 1.9% of income, and energy and fuels = 3.3% of MHI), and on the cost of bottled water (about 2.1% of MHI). [EPA, 1998(b), p. 45]

Individual states are free to develop their own criteria for determining an affordability threshold in their drinking water programs. Some states use a ratio of water charges to MHI but set the affordability threshold at a lower level than the EPA’s 2.5%. New York State, for example, sets their threshold at 1.0% to 1.5% depending on the level of income. Pennsylvania uses a sliding threshold of 1.0% to 2.0% of MHI depending on the socioeconomic condition of the community. The State of Washington uses an affordability range of 1.25% to 1.75%. [EPA, 1998(b), Appendix F] New Mexico designates 1.5% of MHI as the maximum amount that any disadvantaged community (MHI less than 90% of statewide average) should pay. [NM Finance Authority, “Program”]

The USDA Rural Utilities Service uses a different approach in determining the extent to which a project can qualify for federal funds under the Water and Waste Water Loan and Grant Program. Projects can qualify for 75% federal funding when the median household income is below the higher of the poverty line or 80% of the state nonmetropolitan median income, or 45% federal funding if the MHI is above 80% but below 100% of the statewide nonmetropolitan household income. [USDA, 1999]

Legislation proposed in the 109th Congress allows the Secretary of Interior to determine the Federal share of construction costs based on an analysis of per capita income, median household income, poverty rate, ability to raise revenues, the strength of the balance sheet and the existing cost of water, all relative to regional averages. [109 S. 897, Section 106(f)(2)] However, the bill

does not specify any threshold for these measures.

The Asian Development Bank and the World Bank use a rule of thumb that water costs should not exceed 5% of household income. [See Churchill, p. 102; ADB, p. 58; IRC, p. 17 (3% to 5%)]. For example, in the China Rural Water Supply Project costs of 3.6% to 3.7% of household income are characterized as appearing to be “affordable.” [World Bank, pp. 5-6] Similarly, in a Chilean water supply project subsidies are provided to limit the maximum household payments for water and sewer to 5% of monthly household income. [Kessides, p. 28]

The variety of MHI thresholds used to determine affordability, as well as the application of alternative approaches in defining affordability, highlight the fact that affordability is not an objective economic concept. Rather, affordability is a social or equity concept based on the premise that safe drinking water is a right that all citizens should enjoy, and that no one should have to pay more than some limited percentage of their income to obtain that water supply. This threshold percentage cannot be objectively determined but is based on a subjective judgment of fairness and equity. [See EPA, pp. 7 and 11; CBO, Appendix C; Churchill, p. 102; Bieder, p. 8]

Given this lack of an objective basis for determining affordability it may be useful to show the average percentage of MHI that the Project participants would pay for water. Table 12 shows the Project costs, by component, as a percent of MHI. These percentages are calculated by dividing the average monthly household costs for each component (from Table 6), by the MHI shown in Table 13.

Table 12			
NAVAJO-GALLUP WATER SUPPLY PROJECT			
TOTAL ANNUAL COST (FULL REPAYMENT) / MEDIAN HOUSEHOLD INCOME			
50 year Project life, Federal Financing at 5.375% and NTUA Rates for Energy, 2005\$			
	Navajo	Gallup	Jicarilla
Project Capital Cost	4.6%	1.4%	2.1%
Project OM&R Cost	1.2%	0.4%	1.2%
Project Water Cost	0.0%	0.2%	0.0%
Other Facility Capital Cost	0.2%	0.0%	1.1%
Other Facility O&M Cost	0.0%	0.7%	0.6%
Total Cost	6.1%	2.8%	5.0%

Table 13 NAVAJO-GALLUP WATER SUPPLY PROJECT 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

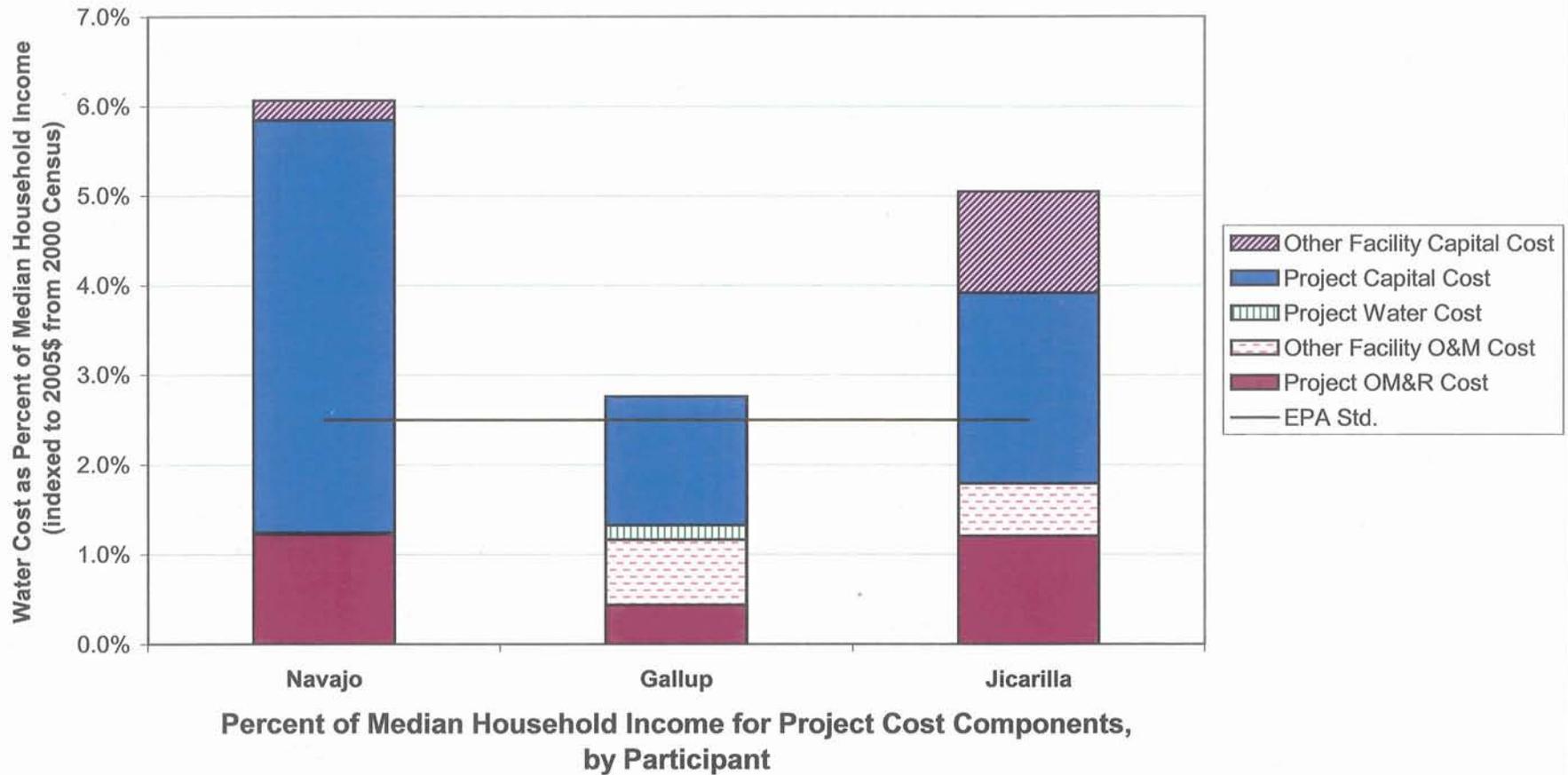
Source: 1999 MHI from U.S. Census Bureau, "2000 Census of Population and Housing," indexed to 2005\$ with U.S. Bureau of Labor Statistics, "Consumer Price Index;" annual growth rates from U.S. Census Bureau, "1990 Census of Housing" and "2000 Census of Population and Housing;" Dornbusch Associates.

The affordability percentages for different Project cost components are shown in Figure 3. Figure 3 also compares these cost percentages to the EPA benchmark 2.5% of MHI. This benchmark is based on the EPA judgment of the affordable portion of household income used to pay for a water supply. Figure 3 shows that the O&M and water costs for all three Project participants are within the EPA threshold of 2.5%, but once full capital cost repayment is added the percentage income needed exceeds the EPA threshold for all three participants.

Other measures of Ability to Pay. Although water cost as a percent of median household income is a common way for programs to measure ability to pay, it is not the only way. Proposed federal legislation, for example, requires the Secretary of the Interior to devise a measure of "capability to pay" by including factors such as per capita income, poverty rate, ability to raise tax revenues, strength of the community balance sheet and existing cost of water, in addition to median household income. While many of these additional measures should be highly correlated to median household income some may not be, and the resulting analysis could provide a more nuanced assessment of affordability, particularly in borderline cases.

Income Disparity. Regardless of how water costs compare to median household income in a community, by definition costs are a greater percentage of household income for one-half of the households and a lesser percentage of household income for the other one-half. This means that even if community-wide water costs are below some threshold of affordability, there may be many individual households within that community for which water costs exceed that threshold. This disparity can be addressed within a community by implementing a progressive rate structure such that a certain basic water supply is available at a relatively low rate and additional amounts of water are available at progressively higher rates. The *average* rate for water can remain the same, but low water users not only pay for less water but also a lower rate for that water, and higher water users not only pay for more water but also a higher rate. This type of price structure encourages water conservation while also addressing the income disparity issue.

Figure 3
Navajo-Gallup Water Supply Project
Water Costs as a Percent of Median Household Income
NTUA Power Rates



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