

Economic and Financial Impacts of the Proposed Flaming Gorge Pipeline

Executive Summary

This analysis considers some of the major economic and financial impacts of the proposed Flaming Gorge Pipeline Project (the Project). Specifically, it focuses upon recreation-related impacts at Flaming Gorge reservoir and on the Green River below the reservoir, and on the potential cost of Project water to Colorado Front Range water users.

Two concepts for a Flaming Gorge Pipeline Project have been publicized, the first being the Regional Watershed Supply Project, or the “Million Project”, named after its proponent, Aaron Million. This well-publicized, privately financed project is in the permitting process but is not assured of moving past this stage. The second concept has been identified by Denver’s south suburban water agencies and involves a pipeline from Flaming Gorge Reservoir to, presumably, the Barr Lake area northeast of Denver. This public sector alternative to the Million Project is in the very early stages of planning and has a similarly uncertain future. For analysis purposes, these projects were considered similar in design, yield, and time frame. As a result, comparisons of the two are based on development and financing costs, and whether the private sector can construct the same project at a lower cost.

Characterizing each concept is a high degree of uncertainty about potential up-front costs, operating costs, demand for Project water, Upper Basin water availability, water rights priorities, hydropower potential, and so on. Very little specific information about either concept has been developed and/or is available to the public, making it nearly impossible to accurately estimate a single cost to potential users. In response to these numerous uncertainties, a supplemental method, Monte Carlo simulation, is used to examine a probability-weighted range of possible values for the uncertain variables. This results in the final estimates also being expressed in terms of their probabilities, or in this case, in their percentiles. For instance, an estimate evaluated at its 50th percentile means that one-half of the estimates generated by the Monte Carlo simulation fell above this value and the other half fell below this value. The 20th and 80th percentile values are also presented to establish a probable range.

Potential Impact to Recreation Value and Recreation-related Expenditures

Impacts to recreation stem from Project-caused reductions in water levels at Flaming Gorge Reservoir and reductions in flow in the Green River below the Reservoir, within the Flaming Gorge National Recreation Area (FGNRA). Impacts were estimated using standard practices for economic analysis, primarily through estimating the changes in recreation visitation and unit day values attributable to the Project. Background data for

visitation and unit day values were updated from the Bureau of Reclamation’s Flaming Gorge EIS. Possible changes to the elevation of Flaming Gorge Reservoir and flow below the dam were estimated using the Bureau of Reclamation’s Colorado River Simulation System (CRSS), modified for this analysis to include pipeline diversions from Flaming Gorge Reservoir and above. Table ES-1 summarizes annual equivalent impacts to recreation benefits.

Reductions in recreation visitation caused by Project water diversions lead to corresponding reductions in regional spending for goods and services supporting the recreation industries, such as lodging, guide services, restaurants, gas stations, and a host of other service industries. The potential impact to regional economic expenditures is shown in Table ES-1.

Table ES-1			
Summary of Recreation-Based Impacts (2011 dollars)			
Adverse economic impact to recreation participants			
	Annual equivalent reduction in benefits	Snapshot of year 2060 impact	Discussion
Flaming Gorge Reservoir	\$7.6 mil	\$15.1 million, estimated at its 50 th percentile; 20 th and 80 th percentile estimates are \$0 mil and \$21.1mil, respectively	These values estimate changes in willingness-to-pay by recreation users; A real discount rate of 3% is used to estimate annual equivalent value; Annual impacts increase over time at Flaming Gorge Reservoir due to its relatively slow drawdown from FGP diversions.
Green River below reservoir	\$3.1 mil	\$2.2 million, estimated at its 50 th percentile; 20 th and 80 th percentile estimates are \$0.50 mil and \$3.8 mil, respectively	
Adverse impact to regional economic expenditures			
	Annual equivalent reduction in expenditures	Snapshot of year 2060 impact	Discussion
Combined economy of Uintah and Daggett counties, Utah, and Sweetwater County, Wyoming	\$38.7 mil	\$23.0 million, estimated at its 50 th percentile; 20 th and 80 th percentile estimates are \$11.6 mil and \$34 mil, respectively	These values estimate changes in regional expenditures caused by changes in recreation use, due to the FGP diversions; As a component of the entire 3-county economy, the impact is less than 1 percent of the total; however, it comprises about 10% to 18% of affected retail and service sectors, depending on the economic multipliers assumed.

Potential Cost to Front Range Water Users

Start-up and long-run costs to Front Range water users were estimated on a financial basis, specifically through a cash flow analysis that calculated annual revenues needed to allow the project to meet its financial obligations through the year 2060. The cash flow analysis considered sources of funds, such as bond proceeds, user charges, and cash contributions; and uses of funds, including construction costs, operating and maintenance costs, and debt service.

Initial construction cost was assumed to lie between \$3.0 billion and \$6.1 billion, with a most likely estimate near \$4.5 billion. Financing costs were higher for a privately-financed project compared to a public project due to assumptions about somewhat higher interest rates on debt and shorter repayment periods. The analysis also allowed private investors on the Project’s front-end a competitive return on their initial, risky investment. In addition, it was assumed that the private sector could construct the Project at a marginally lower cost and that a portion of the operating costs could be recovered through hydropower production, regardless of ownership. Table ES-2 summarizes estimated water charges needed to allow the Project to “cash flow” through 2060.

Table ES-2 Summary of Estimated Revenues Required to Cash Flow the Flaming Gorge Pipeline (2011 dollars)			
Initial 10 years of Project Operation			
	Estimated 50th percentile value	Estimated 20th and 80th percentile values	Discussion
Privately-financed, represented by the Regional Watershed Supply Project (Million Project)	\$4,670 per acre-foot	\$3,860 per acre-foot and \$5,740 per acre-foot, respectively	Assumptions about higher financing costs drive the difference between the public and private projects; The magnitude and variability of the estimates are strongly influenced by start-up demand, construction cost, and financing costs.
Public project	\$2,840 per acre-foot	\$2,400 per acre-foot and \$3,420 per acre-foot, respectively	
Long-term operation			
	Estimated 50th percentile value	Estimated 20th and 80th percentile values	Discussion
Private project	\$3,360 per acre-foot/year	\$2,900 per acre-foot and \$3,900 per acre-foot, respectively	Assumptions about higher financing costs drive the difference between the public and private projects; Construction cost and associated debt repayment most influence the level and variability of the estimates.
Public project	\$2,200 per acre-foot	\$1,940 per acre-foot and \$2,490 per acre-foot, respectively	

Water charges shown in Table ES-2 assume that the availability of water is fixed from year-to-year and known with certainty through the analysis period. In reality, this may not be the case due to two unknown factors: (1) whether the Project will fall under Colorado water law and/or otherwise have a priority date, and (2), the influence of global warming, or climate change. If future priority calls impact Project deliveries, its economic feasibility is diminished, similar to the impact of potential climate change. Table ES-3 examines the impact of a 1-in-10 year priority call and a 1-in-5 year call on a public project when compared to the baseline financial analysis.

Table ES-3 Summary of Potential Impacts of Periodic Priority Calls and Climate Change (2011 dollars)			
	Estimated 50th percentile value	Estimated 20th and 80th percentile values	Discussion
Public project, at full development	\$2,200 per acre-foot	\$1,940 per acre-foot and \$2,490 per acre-foot, respectively	Average year yield to FGP is reduced, with greater down-side variability over time;
Public project including periodic priority calls 1 year in every 10, and climate change	\$2,620	\$2,200 per acre-foot and \$3,220 per acre-foot, respectively	Priority calls are assumed to reduce FGP supplies by 50% in the most likely scenario; bounded by 20% and 100% in the low and high scenarios, respectively;
Public project including periodic priority calls, 1-in-5, and climate change	\$2,900	\$2,390 per acre-foot and \$3,730 per acre-foot, respectively	Climate change impacts are assumed to reduce Project yield between 0% and approximately 0.20% per year, with allowance for “outliers” that cause greater impacts.

Figure ES-1 graphically summarizes the magnitude of the results contained in Tables ES-1 and ES-2.

Table ES-4 shows how the Project’s potential water charges match-up against development costs for other Front Range water supply projects. It is apparent that the FGP’s cost, regardless of ownership, would be significantly higher than those estimated for the projects listed.

Figure ES-1. Range of Costs for the Proposed Flaming Gorge Pipeline, by Financing Source and Development Stage

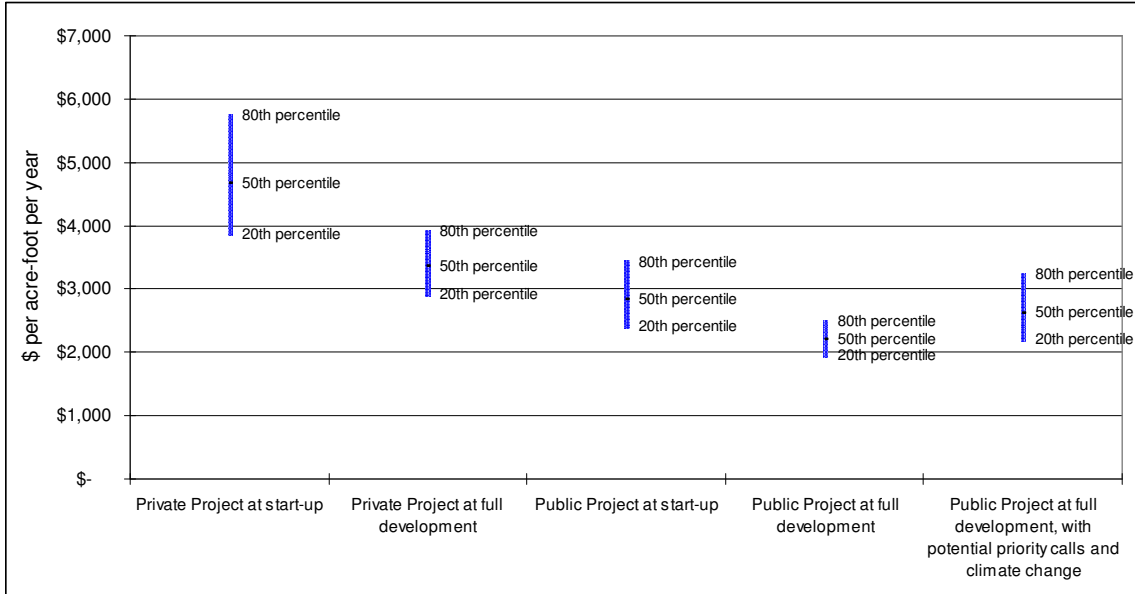


Table ES-4 Range of new water supply costs for Front Range providers							
Provider/project	Est. capital cost¹	Est. annual operation and maintenance cost	Annual cost, capital plus O&M²	Firm yield (AF/year)	Average yield (AF/year)	Cost, \$/AF/year	Discussion
Colorado Springs Utilities, Southern Delivery System	\$880 mil.	\$19 mil.	\$77.5 mil.	42,400	52,000	\$1,800 for firm yield; \$1,490 for avg. yield	Cost at full development, includes treatment
Pikes Peak Regional Water Authority; various water supply alternatives						\$1,600 to \$5,400	Includes treatment ³
Aurora Water, Prairie Waters Project	\$650 mil.	\$1,120/AF	\$54.4 mil.	10,000 at start-up	10,000 AF at start-up, increasing to approx. 50,000 AF at full development	\$5,440 at start-up, declining to approx. \$2,000 at full development	Includes treatment
South Metro Water Supply Authority						\$460 to \$1,200 for intermediate term alternatives; \$1,200 to \$1,900 for long-term alternatives	Includes treatment; updated from South Metro's 2007 Water Supply Plan
Denver Water, Moffat System Expansion	\$140 mil.	\$0.30 mil.	\$9.3 mil.	18,000	18,000	\$530	High quality raw water, O&M not included in cost
Northern Colorado Water Conservancy District, Windy Gap Firming Project	\$273 mil.	\$0.80 mil.	\$18.9 mil.	30,000	30,000	\$630	High quality raw water, O&M not included in cost
Northern Colorado Water Conservancy District, Northern Integrated Supply Project	\$490 mil.	\$2.45 mil. + \$40 per AF for pumping	\$36.6 mil.	40,000	40,000	\$915	High quality raw water
Northern Colorado Water Conservancy	\$8,500 per unit	\$25 per AF unit	\$560 per unit	.60 AF per unit	.70 AF per unit	\$840 to \$980	High quality raw water

¹ Each project may incur additional, unforeseen costs such as treatment plant upgrades and other mitigation, some of which may be substantial. These costs are not included in the calculations.

² For comparison purposes, capital costs for all entities are amortized over 40 years at 6% interest. However, it is recognized that several of the projects have already obtained public financing, or partial financing, at better terms.

³ Avoided Water Supply Costs for PPRWA (draft) memorandum from George Oamek of Honey Creek Resources to Peter Nichols, dated November 3, 2009.

Table ES-4							
Range of new water supply costs for Front Range providers							
District, purchase of Colorado-Big Thompson units		municipal fee				depending on firm or average yield	
Proposed Flaming Gorge Pipeline	Est. to range between 3.0 billion and 6.1 billion	Assumed to range between \$450 mil. and \$600 mil. per year, partially offset by hydropower		Scenarios examined a range varying between 165,000 and 250,000 AF per year		\$4,700 start-up, \$3,300 long term for a private project; \$2,800 start-up, \$2,200 long-term for a public project	High quality raw water; Estimates shown at their 50 th percentiles;