FINAL REPORT

Bartlett Cove Power System Evaluation
Glacier Bay National Park and Preserve
Gustavus, Alaska

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Prepared for

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Draft Report

Glacier Bay National Park and Preserve

Bartlett Cove Power System Evaluation

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Introduction

The Glacier Bay National Park and Preserve (the "Park" or GBNPP) encompasses approximately 3.3 million acres at the northern end of Southeast Alaska. The Park has its headquarters at Bartlett Cove located near the entrance to Glacier Bay. Water, wastewater, and electric utility service is provided to the various buildings and facilities at the Bartlett Cove headquarters complex (referred to as "Bartlett Cove" in this report) by the National Park Service (NPS). Electricity is generated by diesel generators located in a central powerhouse and is distributed throughout Bartlett Cove by means of an underground electrical distribution system owned and operated by the NPS.

Bartlett Cove is located approximately 10 miles west of the community of Gustavus and although a paved road connects Bartlett Cove with Gustavus, access to the area is limited to boat and air transportation. Electric service is provided to the residents and businesses in Gustavus by the Gustavus Electric Company (GEC), an investor-owned electric utility. At the present time, the Bartlett Cove and GEC electric systems are not connected. GEC presently generates all of its electric power with diesel generators but is pursuing development of a small hydroelectric facility to be located approximately five miles northeast of Gustavus on Falls Creek[1]. The energy generation capability of the 800-kilowatt (kW) Falls Creek hydroelectric project (the "Falls Creek Project") is typically more than is needed to supply GEC's power requirements. As such, GEC has approached the NPS with the possibility of electrically connecting Bartlett Cove to GEC and providing hydroelectric energy from the Falls Creek Project to Bartlett Cove.

D. Hittle & Associates, Inc. (DHA) has been retained by the NPS through CTA Architects Engineers to provide a study of the estimated future costs for electric service at Bartlett Cove under two primary alternatives:

1. Continued self generation and independent operation of the Bartlett Cove electric system.

2. Interconnection of the Bartlett Cove system with GEC and the purchase of electric power from GEC.

[1] The Federal Energy Regulatory Commission (FERC) issued a license to Gustavus Electric Company to construct the Falls Creek Project, FERC No. 11659, on October 29, 2004.

In order to accomplish this objective it has been necessary to identify the existing costs associated with operation of the Bartlett Cove electric system and estimate how these costs would change in the future with and without interconnection to GEC. With an independent electric system, the NPS at Bartlett Cove must provide both electric power generation and electric distribution. The electric distribution system includes the underground power lines, vaults, pull boxes, transformers, meters and service connections that are used to distribute power from the generators to the various electric loads at Bartlett Cove. The electric distribution system is well established at Bartlett Cove and the costs to the NPS of maintaining and operating it, which are relatively low, will not change significantly if the GEC and Bartlett Cove systems were to be interconnected. As a result, this study has focused primarily on the costs of power generation which are subject to much more significant change in the future.

This report provides the summary of our investigations, studies and analyses with regard to the future operation of the Bartlett Cove electric power system.

Scope of Services

The primary objective of the study is to establish the cost of providing electrical energy at Bartlett Cove, evaluate the efficiency of the existing system and provide recommendations with regard to the most cost effective future power supply alternatives. The requested scope of services to be provided is defined in four elements as follows:

1. Determine the actual cost of providing power at Bartlett Cove currently and for each of the past ten years.

2. Evaluate the existing power system and provide recommendations for achieving the most efficient and cost effective operation over the next ten years.

3. Estimate the cost needed to provide a reliable interconnection between the Bartlett Cove and GEC electric systems.

4. Evaluate the cost effectiveness of purchasing power from the GEC based on pricing data to be provided by GEC. Evaluate the power supply issues facing the community of Gustavus and the potential cost impacts in the community associated with alternative power supply decisions at Bartlett Cove.

5. Provide a written summary of the issues and alternatives evaluated, study conclusions and recommendations.

It is important to understand that the projection of operating costs in the future is dependent on a number of assumed conditions. Principal among these are future electric power requirements, the future price of diesel fuel and the estimated costs of the Falls Creek Project. The assumptions used in the analysis are specifically identified in this report. To the extent that the results of the analysis would be affected significantly by

alternative assumptions, high and low ranges have also been used to indicate the sensitivity of bottom line results and recommendations to alternative conditions.

An important factor associated with evaluation of the Bartlett Cove electric system is that the NPS essentially manages, administers, operates and maintains all of its utility infrastructure systems (electric, water, wastewater, solid waste, fuel handling, roads) as a combined business operation[2]. Personnel with necessary skills are assigned to the specific utility operations but the accounting of costs, particularly labor costs, are not specific to each utility component and must be assigned accordingly if the "fully allocated cost" of each operation is to be determined. GBNPP management performs an allocation of this type each year in calculating the cost of electric service to its lodge concession.

In conducting this evaluation, John Heberling, an electrical engineer and Senior Consultant with DHA, visited Bartlett Cove on September 23 and 24, 2004 to observe the electric power system, obtain basic data and discuss various issues regarding the study with NPS maintenance management personnel. On September 24, 2004 a meeting was also conducted in Gustavus with the President of GEC to observe GEC electric facilities and discuss issues related to interconnection of the Bartlett Cove and GEC electric systems. Mark Foster, GBNPP Chief of Maintenance, served as the primary NPS representative in the meetings at Bartlett Cove and with GEC.

Much of the basic cost data used in the study was obtained from records provided by the staff at the Park and from information provided by GEC. Additional basic information used in the study was obtained from the Final Environmental Impact Study (FEIS) for the Falls Creek Project[3].

Conclusions

Although the following conclusions are offered at this point in the report, it is important to understand the assumptions and other factors described in subsequent sections of this report that contribute to the conclusions.

1. The electric system at Bartlett Cove appears well-maintained and capable of serving the purpose for which it is intended.

2. Sufficient generating capacity is currently installed at Bartlett Cove to supply the electrical power requirements into the foreseeable future. Over time, periodic overhauls and replacement of the generators will be needed if Bartlett Cove continues to rely upon diesel generators for its primary power generation.

[2] This type of operation would be similar to a small municipality that provides utility service in conjunction with its public works department.
[3] Federal Energy Regulatory Commission, Final Environmental Impact Statement, Glacier Bay National Park and Preserve, Falls Creek Hydroelectric Project (FERC No. 11659) and Land Exchange, June 2004. FERC/FEIS – 0167F, NPS D-118A.

3. The total annual electric energy requirement at Bartlett Cove in 2004 was 1,072,886 kilowatt-hours (kWh) and the annual peak demand is estimated to be 190 kilowatts (kW). Approximately 40% of the total annual energy requirement occurs during the four months, May through August.

4. Over the past ten years, the annual cost of providing electric service at Bartlett Cove has ranged between $100,000 and $208,500, representing a cost of between 11.9 and 19.4 cents per kilowatt-hour of energy production. Of this amount, approximately 50% is attributable to the cost of fuel.

5. If Bartlett Cove continues to rely solely upon its on-site diesel generation, the cost of electric service in Bartlett Cove is estimated to range between 22.7 cents per kWh and 27.3 cents per kWh in 2010, depending on the range of fuel price scenarios evaluated.

6. Interconnection with GEC would only be an economically viable option to the NPS if the Falls Creek hydroelectric project is developed. With interconnection to GEC, it is recommended that the NPS continue to own and maintain the Bartlett Cove diesel generator plant to "firm-up" power deliveries from the run-of-river Falls Creek Project.

7. If interconnection with GEC is to be pursued, it is recommended that an "express" feeder be constructed from the eastern end of the Bartlett Cove electric system to the GEC powerhouse/control center in order to assure the quality and reliability of electric service at Bartlett Cove. The estimated cost of this interconnection is $2.0 million.

8. The annual energy output of the Falls Creek Project will vary from year to year, but is estimated to be sufficient to supplant most of the GEC and Bartlett Cove diesel generation over the next 30 years.

9. Depending on a number of factors, it is estimated that the NPS could realize net present value savings of between $0.1 million and $2.3 million in the cost of electric service at Bartlett Cove over the next 30 years if interconnection to GEC to purchase power from the Falls Creek Project is undertaken.

10. With interconnection between Bartlett Cove and GEC, electric rates in Gustavus should be lower than they would be otherwise. The magnitude of any retail rate impact is difficult to project, however, because of the effect of the State PCE subsidy program and various issues related to development of the Falls Creek Project.

Section 2
Existing Cost of Electric Service

Description of the Bartlett Cove Electric System

The Bartlett Cove electric system primarily consists of a power plant and a 12.47-kilovolt (kV) primary voltage underground distribution system that is used to provide electric service to the various buildings and facilities located in Bartlett Cove. The powerhouse is incorporated within the Utility Service Building located at the west end of the Bartlett Cove complex near the barge dock and the GBNPP visitor's center. The distribution system extends linearly from the powerhouse to the solid waste depot located approximately 1.2 miles east of the powerhouse. Although electricity delivered to many of the end-use facilities in Bartlett Cove is metered, the Park does not bill its various operations for electric service and as a result, it is not necessary to monitor these meters on a regular basis. The Park does charge its lodge concession and employee residential quarters for electric service, however, and separately meters service to the various concession and residence facilities to establish the basis for the amount to be paid for electricity.

The three diesel generators used to supply Bartlett Cove power requirements are located in the Utility Service Building. This building was built in the late 1970s and until 1998 it housed the Bartlett Cove waste water treatment system. Its primary use at the present time is related to electric power generation, electric system control and monitoring, and storage. It is heated with a heat recovery system connected to the diesel generators. The Utility Service Building was modified significantly in 2001 to include new switchgear, a sprinkler system and new office space. The building appears to be in good condition. The combined generation capacity of the generators is 710 kW as shown in the following table.

TABLE 1
Bartlett Cove Diesel Generating Units

Generator Unit	Capacity (kW)	Manufacturer	Engine Model	Year Installed
1	160	Caterpillar	3208	1999
2	275	Caterpillar	3406	2003
3	275	Caterpillar	3406	1995

The generating units and related control and support systems appear to be well maintained and in good condition. Unit #1 was recently overhauled and Unit #3 is scheduled to be overhauled next year. Routine maintenance involves one-day basic servicing every 300 hours of unit operation (about twice per month) and greasing of bearings every 2,000 hours of operation (about three times per year).

In the summer season, the typical electric load in Bartlett Cove is approximately 160 to 170 kW. One of the 275-kW generators is used to supply this load. In the winter months, the typical load is 90 to 112 kW and the 160-kW generator is run to supply this load. The capacity of the diesel generators appears to be well suited to the size of the loads, allowing for one operating unit to be reasonably highly loaded at most times. Diesel generators are generally more fuel efficient when operated closer to full capacity.

Photo 1: Diesel generator Unit No. 1 at Bartlett Cove.

Diesel fuel is stored in underground tanks near the Utility Service Building. Diesel fuel and gasoline are delivered to Bartlett Cove by barge and transferred directly to the fuel storage tanks by means of a fixed pipeline. Fuel is delivered to Bartlett Cove three to four times per year in quantities of approximately 60,000 gallons diesel and 10,000 gallons gasoline per delivery. From the storage facility, fuel is subsequently distributed to supply all the fuel requirements at Bartlett Cove including power generation, NPS vehicles and equipment and space heating. For Fiscal Year[4] 2004, 79,585 gallons of diesel fuel was used for electric power generation.

Maintenance and operation of the electric system is conducted by maintenance staff at Bartlett Cove although outside contractors are used to provide major overhauls and construct new facilities, if needed. There are no employees assigned full time to power production activities since most of the operation is automated. Daily checks of the system are conducted and it is estimated that

Photo 2: Fuel dock and underground fuel storage facility near the utility service building at Bartlett Cove.

[4] The Fiscal Year period is the twelve months ended September 30.

approximately 25% of the General Equipment Supervisor's total time is dedicated to power production functions. The Bartlett Cove staff has the various skills and experience needed to oversee the operation of the electric system on a regular basis. The ability to utilize the Bartlett Cove electric staff on a variety of Park activities allows for much better overall use of staff time than if a dedicated powerhouse crew were in place.

Energy Generation Requirements

The total electric generation at Bartlett Cove in Fiscal Year 2003 was 977,843 kWh and was 1,072,886 kWh[5] in Fiscal Year 2004. Over the ten year period, 1994 through 2003, total energy generation increased 4.7% per year on an average annual basis. Table 2 shows Bartlett Cove energy generation on an annual basis for the years 1994 through 2004.

TABLE 2
Bartlett Cove Annual Energy Generation
(kWh and Average kW)

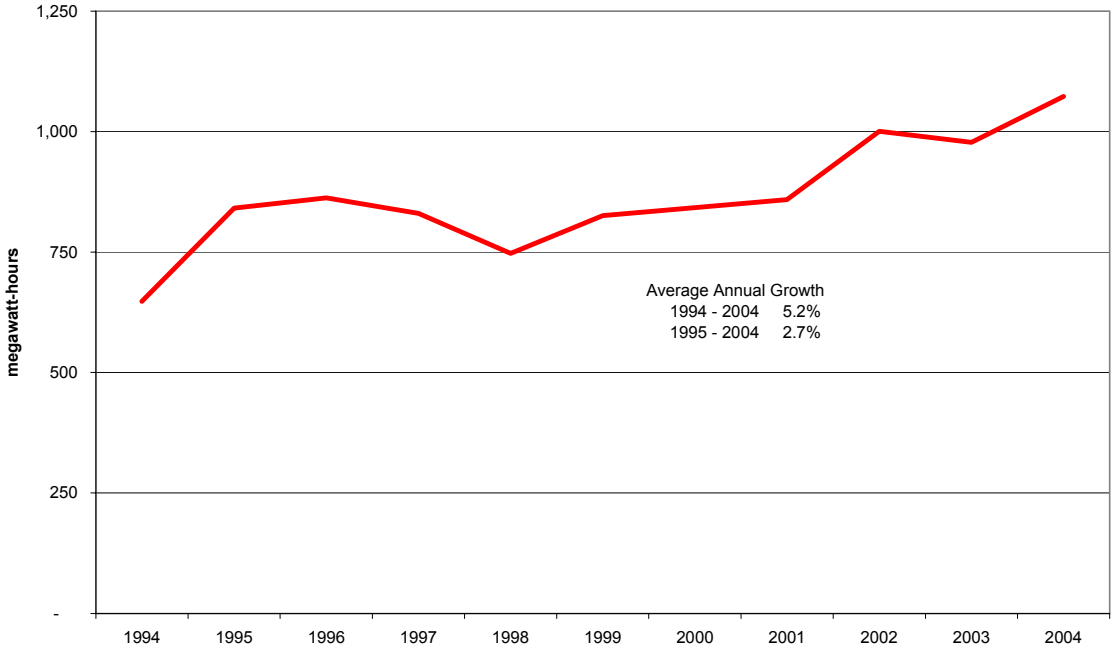
Fiscal Year	Energy Generation (kWh)	Energy Generation (Average kW)[1]
1994	648,000	74.0
1995	841,479	96.1
1996	862,881	98.2
1997	830,412	94.8
1998	747,375	85.3
1999	825,756	94.3
2000	842,148	95.9
2001	858,991	98.1
2002	1,000,898	114.3
2003	977,473	111.6
2004	1,072,886	122.1

[1] Calculated as kWh divided by the number of hours in the year, either 8,760 or 8,784 in leap years.

As shown in Table 2, the average energy generation in 2004 was 1,072,886 kWh or 122.1 average kW. Annual energy generation at Bartlett Cove has increased fairly significantly over the past ten years. Between 1994 and 2004, energy generation increased at an average annual rate of 5.2%. Since there was a significant increase in energy generation between 1994 and 1995, the increase between 1995 and 2004 may be more reflective of the long-term trend. The average annual increase in energy requirements between 1995 and 2004 was 2.7%. Figure 1 shows the annual energy generation at Bartlett Cove.

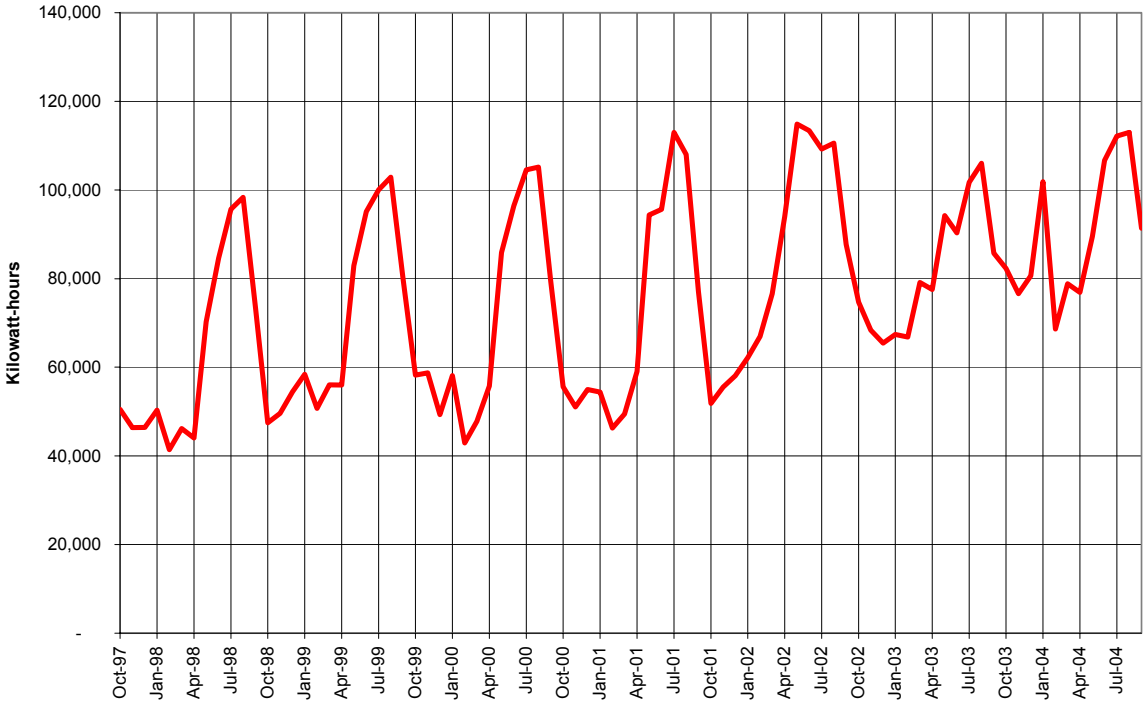
[5] Based on actual generation data for eleven months, October 2003 through August 2004 and estimated for September 2004.

FIGURE 1
Bartlett Cove Annual Energy Generation
(FY 1994 – FY 2004)



Much more energy generation is required in the summer than in the winter. Peak generation typically occurs in July and August while the minimum generation is in January and February. Most communities in Alaska experience higher demands in the winter months although a number of communities that support significant seafood processing and tourist activities see higher summer loads. Monthly energy generation at Bartlett Cove over the past seven years is shown in Figure 2.

FIGURE 2
Bartlett Cove Monthly Energy Generation
(FY 1998 – FY 2004)



Of the total generation requirement at Bartlett Cove, approximately 30% is attributable to the Park's lodge concession. Table 3 shows the percentage of total annual generation used by the Park concession for the period 1998 through 2003.

TABLE 3
Bartlett Cove Annual Energy Generation to Park Concession

Fiscal Year	Total Energy Generation (kWh)	Concession Energy Use (kWh)	Concession Energy Use (% of Total)
1998	747,375	233,370	31%
1999	825,756	253,611	31%
2000	842,148	325,189	39%
2001	858,991	330,324	38%
2002	1,000,898	322,274	32%
2003	977,473	236,339	24%

Cost of Electric Service

The costs incurred by the NPS to provide electric service at Bartlett Cove consist primarily of fuel expenses, staff labor, materials and supplies related to power generation. Since Bartlett Cove electric service is an integrated function of the overall maintenance activities at the Park, certain labor costs must be allocated among the electric, water and wastewater functions rather than directly assigned to these functions. Diesel fuel delivered to the Park is used for power generation, space heating and operation of vehicles and equipment. Fuel used for power generation is measured and costs are assigned in accordance with the measured use. The cost of fuel represents roughly 50% of the total cost of power generation but can vary widely from year to year based on the price of fuel.

Each year the Park prepares a "cost analysis worksheet" primarily to determine the allocation of utility costs to the lodge concession. The Park's cost analysis uses a reasonable approach to allocation of common costs between the utility functions and applies an allowance for depreciation of the generation equipment. When compared to typical electric utilities, however, it is noted that the cost analysis does not include deprecation expenses for the powerhouse building and for the electrical distribution facilities. Electric utilities would also typically include interest costs[6] in determining their cost of electric service for ratemaking purposes. Based on the method of funding capital investment it may not be necessary for the Park to include the additional depreciation and interest expenses. The costs of managing and administering the electric utility function are assigned by the application of an NPS-defined 15% indirect cost.

The Park's annual cost analysis provides a reasonable estimate of the cost of electric service at Bartlett Cove. Table 4 summarizes these costs for each of the past six years. Additional cost data for the ten year period 1995 through 2004 is shown in Appendix A.

[6] Investor-owned utilities, such as Gustavus Electric Company, also are allowed to recover a return on their equity investment in electric system facilities.

TABLE 4
Bartlett Cove Annual Power Production Costs [1]

	Fiscal Year Ending September 30					
	2004	2003	2002	2001	2000	1999
Total Generation (KWh)	1,072,886	977,473	1,000,898	858,991	842,148	825,756
Fuel Use (gallons)	79,585	72,778	74,586	64,363	64,279	63,749
Fuel Use (kWh/gallon)	13.5	13.4	13.4	13.3	13.1	13.0
Average Fuel Cost ($/gallon)	$ 1.4500	$ 1.0700	$ 0.8458	$ 1.0621	$ 0.8419	$ 0.7460
Fuel Handling ($/gallon)	$ 0.3010	$ 0.0733	$ 0.1019			
Lube Oil Use (gallons)	321	294	268	260	284	271
Average Lube Oil Cost ($/gallon)	$ 3.45	$ 4.07	$ 2.81	$ 2.90	$ 4.31	$ 5.25
Operating Expenses						
Fuel	$ 115,398	$ 77,872	$ 63,085	$ 68,361	$ 54,116	$ 47,557
Fuel Handling and Storage	23,955	5,335	7,600	-	-	-
Subtotal - Fuel	$ 139,353	$ 83,207	$ 70,685	$ 68,361	$ 54,116	$ 47,557
Lube Oil	1,108	1,197	753	753	1,224	1,424
Supplies & Materials	2,584	10,582	3,590	3,537	-	5,649
Generator Repairs	-	11,958	-	-	-	-
Cyclic Maintenance	4,914	-	2,243	2,243	2,243	-
Operations & Maintenance Labor	22,773	43,761	17,844	19,675	19,235	21,329
Subtotal - Operating Expenses	$ 170,732	$ 150,705	$ 95,115	$ 94,569	$ 76,818	$ 75,959
GSA Vehicle Cost	3,704	4,797	5,027	5,041	4,595	4,572
Depreciation Expense						
Generators	6,838	6,838	5,625	5,625	5,625	5,625
Other	-	-	-	-	-	-
Subtotal - Depreciation	$ 6,838	$ 6,838	$ 5,625	$ 5,625	$ 5,625	$ 5,625
Indirect Cost (15%)	27,191	24,351	15,865	15,785	13,056	12,923
Total Cost of Production	$ 208,465	$ 186,691	$ 121,632	$ 121,020	$ 100,094	$ 99,079
Unit Cost of Production (¢/kWh)	19.4	19.1	12.2	14.1	11.9	12.0

[1] Cost data derived from NPS cost analysis worksheets.

As can be seen in Table 4, the total cost of power production is reported to have ranged between 11.9 cents/kWh in 2000 and 19.4 cents/kWh in 2004. Much of this variation is attributable to the cost of fuel; however, other factors such as the allocated labor cost and generator repair costs vary from year to year also. The replacement of a generator in 2003 would have contributed to a somewhat higher operations and maintenance labor expense in that year. In 2002, the cost of fuel handling and storage was allocated to the cost of electric service for the first time. Cyclic maintenance expense, which is based on spreading the cost of major maintenance expenses over a multi-year period[7], has been included in some years as shown in Table 4.

Although some abnormalities may exist in the allocation of costs as shown in Table 4, the costs are reasonable when compared to the cost of power production for small, diesel generator based electric utilities in rural Alaska. The total cost of power production for each of the past ten years is summarized in Table 5.

[7] Typically five to seven years.

TABLE 5
Bartlett Cove Annual Cost of Power Production

Fiscal Year	Annual Cost	Unit Cost (¢/kWh)
1994	$ 122,851	19.0
1995	156,155	18.6
1996	149,553	17.3
1997	134,734	16.2
1998	119,115	15.9
1999	99,079	12.0
2000	100,094	11.9
2001	121,020	14.1
2002	121,632	12.2
2003	186,691	19.1
2004	208,465	19.4

As shown in Table 4, the total cost of power production is composed of several components. These components are shown graphically in Figure 3 in total dollars and in Figure 4 as unit costs expressed as cents per kilowatt-hour (kWh).

FIGURE 3
Bartlett Cove Historical Annual Power Production Costs

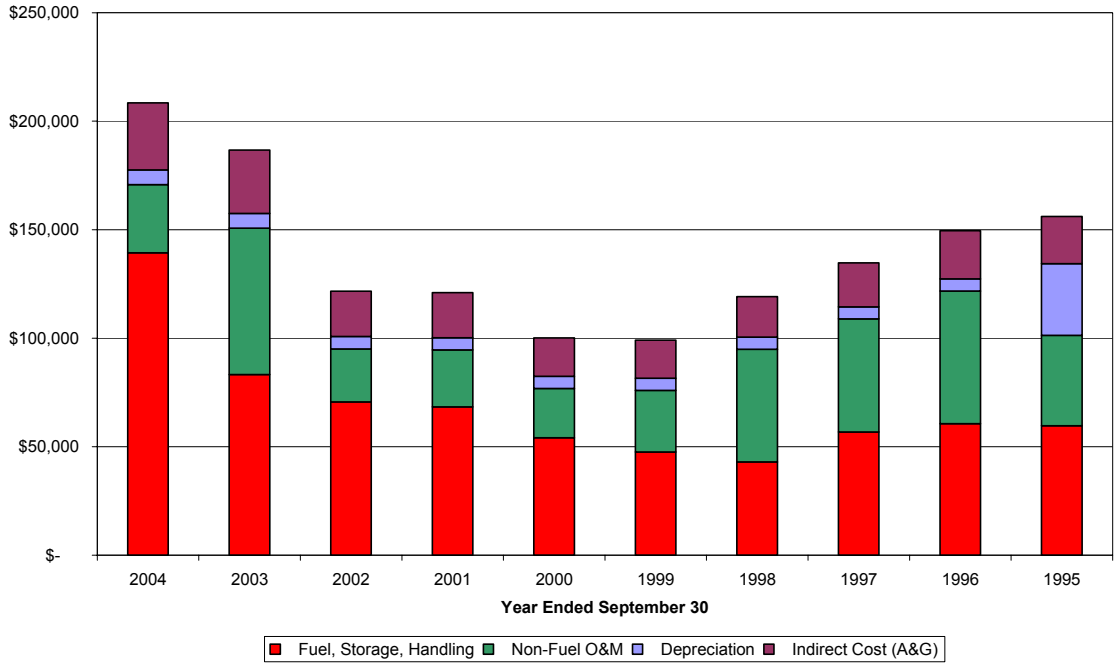
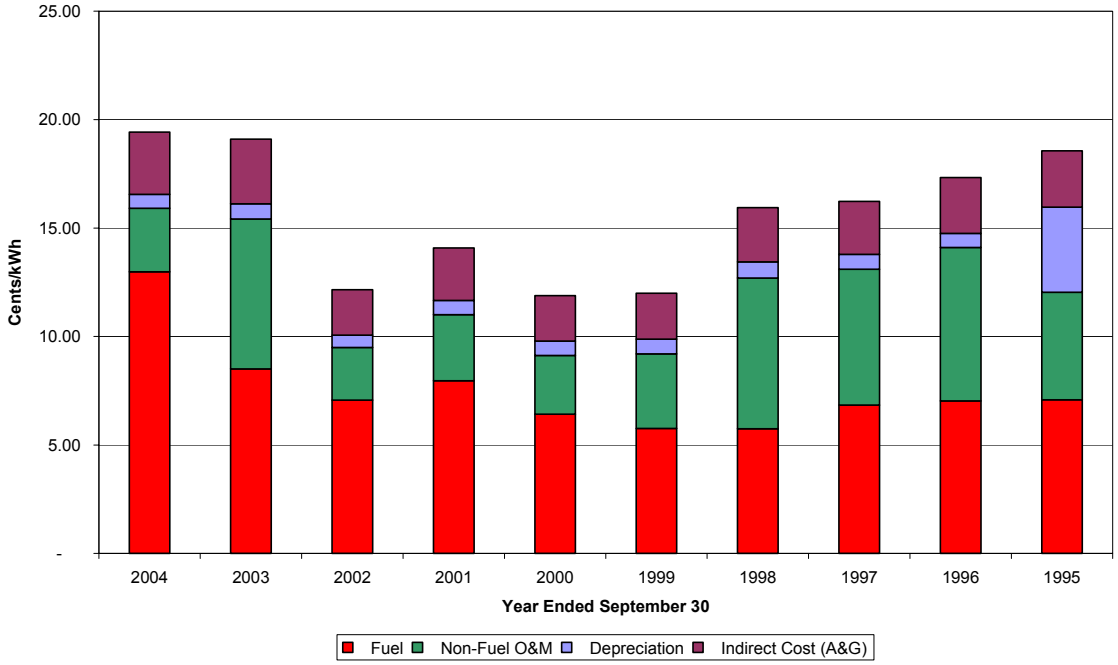


FIGURE 4
Bartlett Cove Historical Annual Power Production Unit Costs
(cents/kWh)



In Figures 3 and 4, the Non-Fuel O&M costs include costs of lube oil, supplies, materials, generator repairs, cyclic maintenance, operation and maintenance labor and GSA vehicle expenses. These costs have varied, but in about half the years shown in the figures, including 2003, have been about seven cents per kWh. The variation appears to be due primarily to how labor costs are allocated each year. In addition, generator repairs and other major maintenance expenses occur in some of the years but not in others. Major maintenance expenses should, however, be spread over several years through the use of the cyclic maintenance charge. Administrative & General costs shown in Figure 3 and Figure 4 are the indirect charges computed as 15% of direct costs.

Fuel costs shown in Figure 3 and Figure 4 represent the most significant cost component associated with power production at Bartlett Cove. It is important to note that in 2003, the average cost of diesel fuel at Bartlett Cove was $1.07 per gallon. In the summer of 2004, the fuel cost at Bartlett Cove was approximately $1.50 per gallon. At this price, the cost of power production would be approximately 22.8 cents/kWh compared to 19.1 cents/kWh in 2003. Table 6 shows the annual fuel use and average annual fuel price at Bartlett Cove.

TABLE 6
Bartlett Cove Annual Generation Fuel Use and Cost

Fiscal Year	Total Generation (kWh)	Fuel Use (Gallons)	Fuel Use (kWh/gal)	Average Fuel Cost ($/gallon)
2004	1,072,886	79,585	13.5	$ 1.45
2003	977,473	72,778	13.4	1.07
2002	1,000,898	74,586	13.4	0.85
2001	858,991	64,363	13.3	1.06
2000	842,148	64,279	13.1	0.84
1999	825,756	63,749	13.0	0.75
1998	747,375	57,690	13.0	0.75
1997	830,412	63,918	13.0	0.89
1996	862,881	66,603	13.0	0.91
1995	841,479	66,235	12.7	0.90
1994	648,000	60,137	10.8	0.95

Fuel efficiency at Bartlett Cove has steadily improved over the past ten years and was at 13.4 kWh/gallon in 2002 and 2003. This is reasonably good fuel efficiency for a power system the size of Bartlett Cove.

Based on our review of the available cost data as shown in the previous tables and figures, it would appear that the total non-fuel costs of electric service in 2003 are reasonably representative of the average cost of electric service for the purpose of establishing projections of future costs. Fuel handling and storage costs were first allocated to the electric operation beginning in 2002. Further, the allocation of O&M labor to the electric operation appears relatively low between 1999 and 2002 when compared to the allocated costs over a longer period of time.

As previously mentioned, the cost of electric service as defined in the Park's cost allocation worksheet does not include any depreciation expense related to the powerhouse building and the electric distribution facilities (i.e. the conductors, transformers, meters and other devices used to distribute power throughout Bartlett Cove.) Depending on how these facilities were initially funded, it may or may not be appropriate to include depreciation in assessing the overall cost of electric service. Based on information provided by Park staff, the current replacement value (CRV) of the powerhouse/utility building is $1.8 million. As an example, assuming the building was constructed in the late 1970's and that it is 50% allocated to the electric operation, the annual depreciation expense would be approximately $12,000 per year. Note that this example does not reflect the cost of recent improvements to the powerhouse.

With regard to administrative and general costs, the NPS-defined policy of 15% indirect cost is considered a reasonable substitute, however, it cannot be stated as to whether or not the 15% amount is truly reflective of actual electric-related management and administrative costs at Bartlett Cove.

Section 3
Projected Cost of Electric Service

Introduction

Unless GEC develops the Falls Creek hydroelectric project and Bartlett Cove interconnects with GEC, diesel generation is expected to continue to be the primary source of power supply at Bartlett Cove in the foreseeable future. Natural gas for generation fuel is not available in the Gustavus area and other alternative power supply options such as wind energy generation systems, fuel cells and tidal generation systems are considered impractical[8]. Consequently, for the purpose of projecting the future cost of electric service at Bartlett Cove, diesel generation is considered the base, or status quo, case. Interconnecting with GEC and purchasing power generated at Falls Creek is the alternative case.

The primary objective of this analysis has been to estimate the cost of electric service at Bartlett Cove for both the Base (Diesel) and GEC Interconnection cases over a 30-year projection period. The cost of service for the two cases was then compared to determine the lowest cost alternative. For the GEC Interconnection Case, it is presumed that the Bartlett Cove and GEC electric systems will remain independent operating units.

The costs of electric service at Bartlett Cove for the Base (Diesel) Case have been projected assuming that the allocation of Park maintenance labor costs will remain similar to present levels. The use of diesel fuel and diesel fuel prices have been projected based on specific assumptions identified below. It is expected that the existing diesel generators will be replaced after respective 15-year operating periods. It is also expected that as diesel generators are replaced in the future at Bartlett Cove, better fuel efficiency and other benefits could potentially be realized with newer technology equipment.

For the alternative GEC Interconnection Case, the need for diesel generation at Bartlett Cove is projected to decrease substantially. Diesel generation will continue to be needed but only periodically. As a result, the costs to operate and maintain the Bartlett Cove powerhouse should decrease with the Interconnection Case.

Assumptions

In order to project the cost of electric service at Bartlett Cove in the future a number of assumptions must be made. Principal among these are the future demand for power at Bartlett Cove and the future price of diesel fuel. Since both of these variables can change

[8] The FERC indicated its general dismissal of alternative or renewable forms of energy in the Gustavus area in its Order Issuing License for the Falls Creek Project dated October 29, 2004. In general, winds are insufficient in the Gustavus area, fuel cells require natural gas or propane and are a new technology with very high capital costs and tidal generation opportunities are hypothetical at best.

dramatically, a range of possible outcomes has been considered in the analysis. The primary assumptions used in the analysis are summarized as follows:

1. Electric loads at Bartlett Cove will increase 3% per year for the medium growth scenario. Alternatively, loads will increase at 1.5% and 5% per year for the low and high growth scenarios, respectively.

2. General inflation is 2.5% per year.

3. The price of diesel fuel is based on a rate of $1.30 per gallon in 2005 escalated at a rate of 3.0% per year (i.e. 0.5% more than the assumed rate of general inflation) for the medium fuel price scenario. Alternative fuel price scenarios are $1.10 per gallon and 2.5% annual escalation for the low fuel price case and $1.50 per gallon and 3.5% annual escalation for the high fuel price case.

4. Fuel handling and storage costs allocated to the electric operation at Bartlett Cove will be comparable to costs allocated in 2003 increasing annually at the assumed rate of general inflation.

5. The useful life of diesel generators at Bartlett Cove is 15 years[9]. New diesel generators will cost $300 per kW installed at 2004 cost levels.

6. O&M labor costs allocated to the electric system at Bartlett Cove will be comparable to costs allocated in 2003[10] increasing annually at the assumed rate of general inflation.

With the dramatic increase in world oil prices the past year, generation fuel prices have increased significantly at Bartlett Cove. During 2004, diesel fuel prices at Bartlett Cove ranged between $0.98 and $1.67 per gallon reaching the high price in late September 2004. In October 2004, fuel prices went as high as $1.85 per gallon before declining slightly to $1.60 in late November. These rapid and significant price fluctuations correspond to world oil prices that exceeded $50 per barrel in the fall of 2004.

In its Annual Energy Outlook 2004, the federal Energy Information Administration (EIA) projected the average world oil price to be $23.30 in 2005 (2002 dollars). The variance between recent actual prices and the EIA projected price is such that the absolute dollar price in the EIA report does not appear to be a good basis for projection at the present time. The EIA report also indicates an annual real escalation[11] in world oil prices of 0.6% per year through 2025. This rate of increase has been used as the basis for establishing the price assumptions shown above.

[9] Fifteen years corresponds to the useful life of diesel generators used in calculation of annual depreciation expense in the Bartlett Cove worksheets. Many small rural utilities in Alaska use their diesel generators for a longer time period.
[10] Allocated O&M costs in 2004 were lower than in 2003 due to an employment vacancy for part of the year. Management at the Park indicates that allocated costs in 2003 are more representative of the expected staffing level.
[11] "Real" escalation does not include the effects of general inflation.

For the case involving interconnection with GEC, it has been necessary to estimate the cost of power purchases from GEC. Of principal consideration in this case is the cost of power production at the Falls Creek hydroelectric project. The cost of the Falls Creek project was estimated in the Falls Creek FEIS prepared by FERC. The estimated cost in the FEIS, based on 2001 dollars, has been used in this study with some modification to allow for additional cost escalation. With a capital-intensive generating plant like a hydroelectric project, the capital carrying cost is a critical component of the revenue requirement associated with the project. For the purpose of this analysis, it has been assumed that the Falls Creek Project will be debt financed with a loan having a 6.5% interest rate and a 30-year repayment period. These loan parameters are reasonable for a small hydroelectric project owned by an investor owned utility.

It has also been necessary to develop projections of GEC energy requirements as part of this study. Assumptions related to GEC are described in subsequent sections of this report.

Projected Energy Requirements

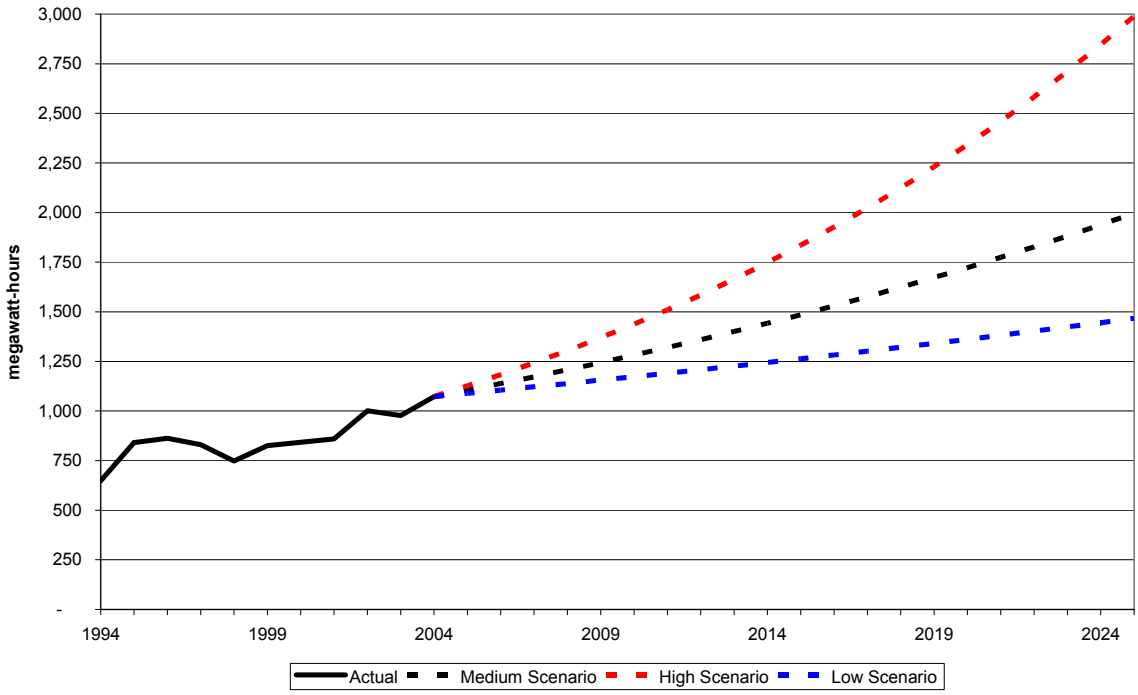
Electrical energy requirements at Bartlett Cove have increased steadily over the past ten years and are projected to increase within a range of 1.5% to 5.0% per year in the future. For the medium growth case, an increase of 3% per year is assumed in the future. Projected energy requirements and peak demand are summarized in the following table.

TABLE 7
Bartlett Cove Projected Energy Requirements and Peak Demand

	Total Energy Requirements (MWh)			Peak Demand (kW)		
	Load Growth Scenario			Load Growth Scenario		
	Medium	High	Low	Medium	High	Low
2003 (actual)	978	-	-	172	-	-
2004 (actual)	1,073	-	-	188	-	-
2005	1,105	1,127	1,089	194	198	191
2010	1,281	1,438	1,173	225	253	206
2015	1,485	1,835	1,264	261	322	222
2020	1,722	2,342	1,361	302	411	239
2025	1,996	2,989	1,467	351	525	258
Average Annual Increase	3.0%	5.0%	1.5%			

According to Park staff, Bartlett Cove has experienced significant growth over the past ten years with the completion of several major infrastructure projects contributing to a much higher average annual increase in electric energy requirements than will probably be realized in the reasonably near future. As a result, it may be more appropriate to consider the lower end of the forecast range to be more reasonable than that the high end. Projected energy requirements are shown graphically in Figure 5.

FIGURE 5
Bartlett Cove Actual and Projected Annual Energy Requirements
(MWh)



Projected Cost of Electric Service – Base (Diesel) Case

If Bartlett Cove continues to supply its own power generation, the cost of electric service in the future will be highly dependent on the cost of diesel fuel. The existing generating capacity at Bartlett Cove, the powerhouse, fuel storage facilities and other related electric facilities are expected to remain adequate to supply the full power requirement. Periodic overhauls of the generators will continue to be needed and over time, the generators will need to be replaced. Certain components in the system will also need periodic replacement but the costs associated with smaller component replacements and overhauls are already factored in to the maintenance cost at Bartlett Cove. The cost of new diesel generators will be recovered through an adjustment to the deprecation charge when the units are installed.

Based on the installation dates of the existing generator units and the assumed average 15-year usable life of diesel generators, a new 275-kW generator would need to be installed at Bartlett Cove in 2010. The installed cost of this unit is estimated to be $93,000 at that time. The 160-kW unit would be replaced in 2014 at an estimated cost of $60,000 and another 275-kW unit would be replaced in 2018 at an estimated cost of $114,000.

Based on the previously defined assumptions, the medium fuel price scenario and the medium load growth scenario, the projected cost of electric service at Bartlett Cove is shown in the following table.

TABLE 8
Bartlett Cove Projected Cost of Power
Base Case – Diesel Generation
(Medium Load Growth Scenario, Medium Fuel Price Scenario)

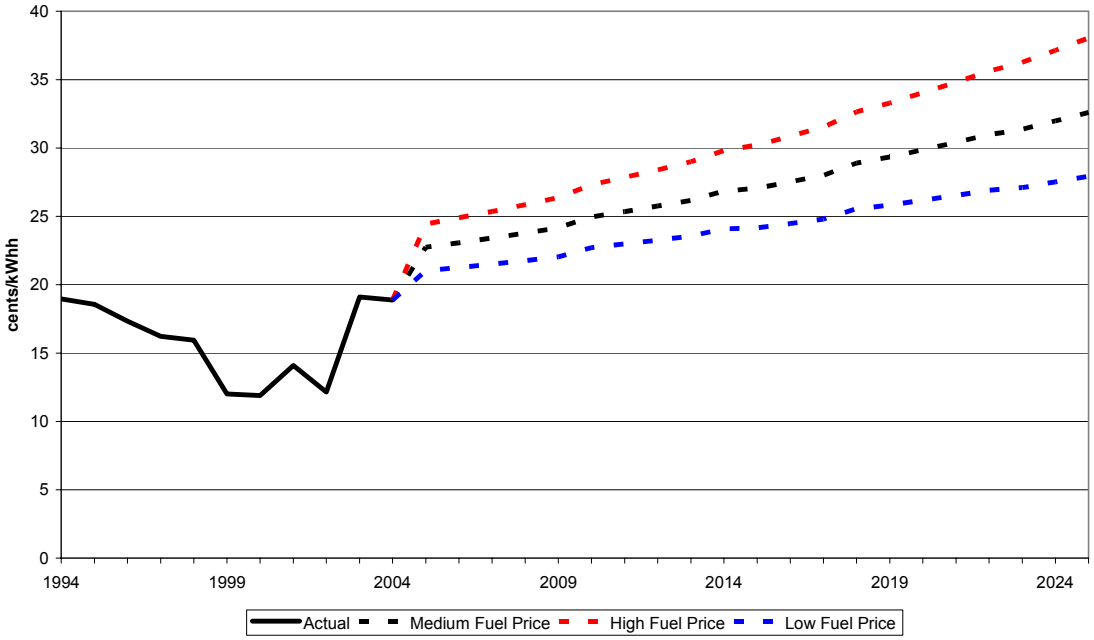
	2005	2010	2015	2020	2025	2030
Fuel Cost ($/gal) [1]	$ 1.30	$ 1.51	$ 1.75	$ 2.03	$ 2.35	$ 2.72
Fuel Handling ($/gal) [2]	$ 0.300	$ 0.339	$ 0.384	$ 0.434	$ 0.492	$ 0.556
Diesel Gen. (MWh) [3]	1,105	1,281	1,485	1,722	1,996	2,314
Fuel (gallons 000) [4]	82	95	110	128	148	172
Production Expense ($000)						
Fuel	$ 107	$ 144	$ 193	$ 259	$ 348	$ 468
Fuel Handling	25	32	42	56	73	96
O&M [5]	60	68	77	87	98	111
Major Maintenance [6]	20	23	26	29	33	37
Subtotal	$ 211	$ 266	$ 338	$ 431	$ 552	$ 712
Depreciation [7]	7	12	12	16	13	13
Indirect Charge [8]	33	42	52	67	85	109
Total Cost	$ 251	$ 320	$ 402	$ 514	$ 651	$ 834
Unit Cost (¢/kWh) [9]	22.7	25.0	27.1	29.9	32.6	36.1

[1] Includes 3.0% annual escalation applied to initial assumed fuel price (0.5% over assumed general inflation.)
[2] Based on cost allocated to electric system in 2004. Includes assumed annual inflation.
[3] Total energy generation requirement at Bartlett Cove. See Table 7.
[4] Based on average fuel consumption of 0.0743 gallons per kWh (13.45 kWh per gallon).
[5] Based on existing allocation of maintenance labor costs. Includes assumed general inflation.
[6] Based on existing level of expenditure including assumed general inflation.
[7] Depreciation charges on diesel generators based on a 15-year depreciation period. Includes replacement of existing generating units in 2010, 2014 and 2018.
[8] Based on 15% of direct costs per established NPS policy.
[9] Total cost divided by diesel generation.

As can be seen in Table 8, the estimated cost of electric service in Bartlett Cove for the Base Case is $251,000, or 22.7 cents per kWh, in 2005. This cost is estimated to increase to $834,000, or 36.1 cents per kWh, in 2030. The costs shown in Table 8 include depreciation on existing and new diesel generators but do not include depreciation on the powerhouse building or the electric distribution facilities; however, depreciation expenses on these facilities would not change as a result of the alternatives evaluated in this study.

Fuel costs are the most significant variable affecting the estimated cost of power production at Bartlett Cove. Figure 6 shows the projected cost of power at Bartlett Cove for the Base Case using the medium, high and low fuel price scenarios.

FIGURE 6
Bartlett Cove Actual and Projected Annual Cost of Power
Base (Diesel) Case
(cents per kWh)



Estimated Cost of Interconnection with Gustavus Electric

The primary alternative to generating power at Bartlett Cove would be to interconnect the Bartlett Cove electric system with GEC and purchasing power from GEC to supplant most of the diesel generation in Bartlett Cove. Under this alternative, the NPS needs to be assured that reliability and quality of electric service would be comparable to what is provided at the present time by the Bartlett Cove power system. To gain this assurance, the power generation facility in Bartlett Cove would need to be maintained for backup purposes and the Park would want to continue to own and operate the electric distribution system itself. Due to the potential irregularity in hydroelectric energy generation at the Falls Creek Project caused by variations in local precipitation, the Park would also need to use its power plant to supplement or "firm-up" purchases of hydroelectric energy from GEC. The continued operation of the Bartlett Cove power plant for backup and supplemental power generation would mean that some of the operating expenses for this facility would continue to be incurred.

With the aforementioned issues in mind, interconnection with GEC would be undertaken to obtain hydroelectric power available from the Falls Creek Project for use at Bartlett Cove. The two electric systems, Bartlett Cove and GEC, would remain separate

operations with a common power supply source. The cost and availability of power from Falls Creek is a significant factor in determining the potential benefits and costs the Park would realize with the interconnection. A contractual arrangement between the NPS and GEC would be needed to precisely identify the pricing associated with the power purchase. For the purpose of this analysis, an estimated pricing arrangement has been assumed so that a cost comparison can be formulated. The amount of power estimated to be typically available to Bartlett Cove from Falls Creek has also been defined. The estimation of Falls Creek power availability presumes that GEC will have first priority to supply the needs of its own customers before selling power to Bartlett Cove.

Another significant issue associated with Bartlett Cove interconnection with GEC is the specification and cost of the necessary interconnection system itself. It is expected that the interconnection facilities would be funded, owned and operated by the NPS and constructed to NPS standards. Description of the interconnection facilities follows in this section of the report.

The Existing Electrical Systems

Presently the electric loads at Bartlett Cove are served from a primary underground distribution system owned and operated by the NPS. Electricity is generated at the Bartlett Cove diesel generation building and distributed through a series of pad mount transformers and pad mounted switches to the Park facilities. The electric system operates at 12.47/7.2-kV and is in a grounded wye configuration. The main NPS feeder is approximately 1.5 miles long, three phase, #2 Copper conductor, UL listed MV 105 cable installed in conduit. The cable uses a premium EPR insulation rated at 130% of nominal.

The cable type, generation facility and overall installation appears to meet best industry practices for reliability and flexibility in operations, maintenance and system life. The Bartlett Cove electric system is not operated for profit but at cost. Some electric costs are recovered through payments by the Park concession. The Bartlett Cove electric distribution system extends east from the powerhouse but does not extend to the Park boundary, located an additional 2.9 miles east from the current end of the distribution feeder along Glacier Bay Park Road. The end of the existing GEC distribution system is encountered and additional 1.3 miles from the Park boundary along Glacier Bay Park Road. The total "gap" between the Bartlett Cove and the GEC systems is approximately 4.2 miles.

Photo 3: Modular Oil Switching Terminal (MOST) #5 located at east end of Bartlett Cove electric distribution system.

GEC serves the commercial and

residential areas in and around Gustavus. The GEC system is mostly underground construction and is operated at 12.47/7.2-kV grounded wye, the same as the Bartlett Cove system. The GEC system is served from a diesel generation powerhouse near the airport.

Photo 2: GEC powerhouse.

The powerhouse building is functional, and the four diesel generators with a combined capacity of 1,170-kW are all reliable refurbished or rebuilt units. The step-up transformer yard adjacent to the powerhouse is outdated and in need of replacement to meet current National Electric Safety Code requirements. GEC indicates that it is planning to update the powerhouse, transformer yard and system control facility concurrent with development of the Falls Creek Project. With limited loads to serve, high fuel and infrastructure costs combined with the need to operate at a profit, the GEC system has some of the highest retail rates in Alaska. The system feeders are constructed using #2 Aluminum, XLP insulated cable and much of the system utilizes direct buried underground cable construction.

Photo 4: Portion of GEC transformer yard at the powerhouse.

System Interconnection Options

The Falls Creek Project proposed construction includes a distribution feeder from the Falls Creek site to the GEC powerhouse, a distance of approximately five miles. The Falls Creek Project is located to the northeast of Gustavus and the Bartlett Cove system is located to the west of Gustavus. Any Falls Creek Project power delivery to Bartlett Cove will likely involve connection to the town system in some way. Connection of the two systems for power transfer creates one new larger system that may operate differently and have different reliability than the present systems. Indeed, as much as twelve new miles of underground cable may be added, greatly increasing the outage

exposure of the existing customers.

Other factors to consider include voltage regulation of the new combined system, reactive power management of the underground cable, metering of the delivered power and separation of the Bartlett Cove and GEC systems under fault conditions. The systems will also need to retain the ability to operate separately as they do now since Falls Creek power will not be available at all times of the year. Reactors to manage the system reactive power flows will be required under any connection scenario. This study explores the two most likely options for system connection.

Option 1: Transmit Power from Falls Creek to Bartlett Cove Over the GEC System

Option 1 uses the existing GEC distribution system to transmit or "wheel" Falls Creek power to the Bartlett Cove system. Since the Falls Creek project would be connected to the GEC system with a new underground cable, this option minimizes the amount of additional new line construction and simply fills in the gap between the two systems. Exhibit A illustrates the proposed connection.

The Bartlett Cove system would be extended underground to the east nearly three miles to the park boundary and constructed to NPS standards. The GEC system would be extended to the west 1.3 miles and be constructed to GEC standard except with conduit type construction rather than direct burial of the underground cable. In addition, 1.8 miles of the existing GEC system would need to be rebuilt from single phase construction to three phase construction to allow for a full system interconnection. Power deliveries to or from Bartlett Cove would be metered at a pad mounted primary metering station at the park boundary. Metering at the boundary allows for both GEC and Bartlett Cove service loads to develop in the future without disrupting the metering accuracy.

To provide for separation of the systems under fault conditions, a pad mount breaker and protective bidirectional relaying would be installed at either the connection point with the GEC system or at the NPS boundary location. The protective relaying must include fault direction sensing along with system stability checks such as over and under voltage and frequency monitoring. The breaker may also require a communications link to the Bartlett Cove powerhouse and the GEC powerhouse to coordinate independent and connected system operations.

This type of connection, however, exposes the Bartlett Cove system to operating issues on the GEC system. If the GEC system requires service interruption for switching, line maintenance, replacements, repairs or faults, service to Bartlett Cove would be lost. Frequent starts of the Bartlett Cove generation equipment from a hot standby condition may result. The delivered power would also be subject to power quality disturbance if any problems occurred on the GEC system. These might include large motor starting, other customer induced sags or spikes and voltage fluctuation as loads peak and cycle during a typical day. With this configuration, power could not be delivered from the Falls Creek project to Bartlett Cove without first being transmitted over the GEC primary distribution system. Future delivery reliability would be dependant on GEC distribution

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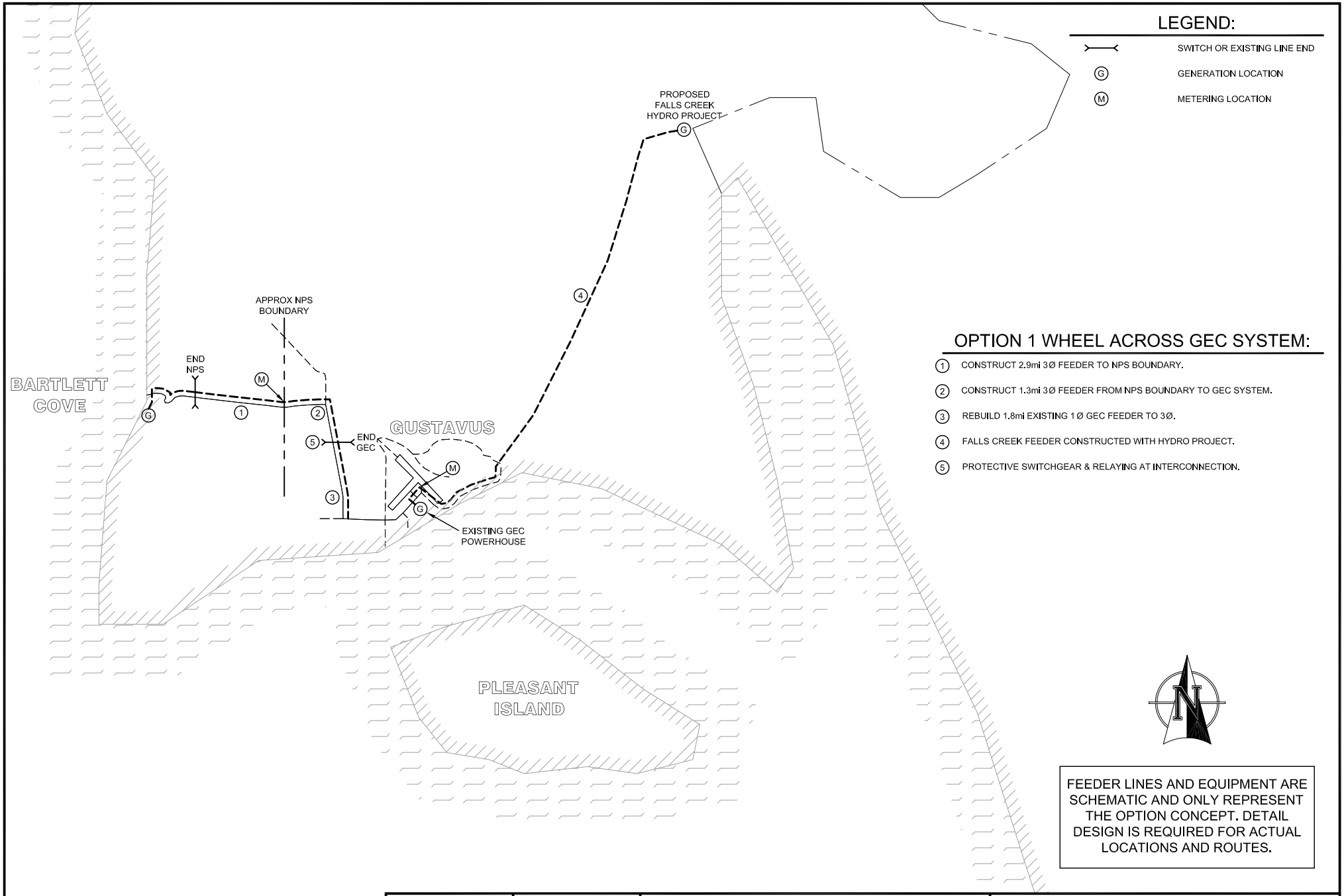

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DITTLE & ASSOCIATES, INC.
Engineers and Consultants

GLACIER BAY NATIONAL PARK
BARTLETT COVE ELECTRIC SYSTEM

EXHIBIT A
BARTLETT COVE/GEC INTERCONNECTION
OPTION 1

system maintenance and capital investment. Option 1 is estimated to cost $1.6 million as shown in the following table.

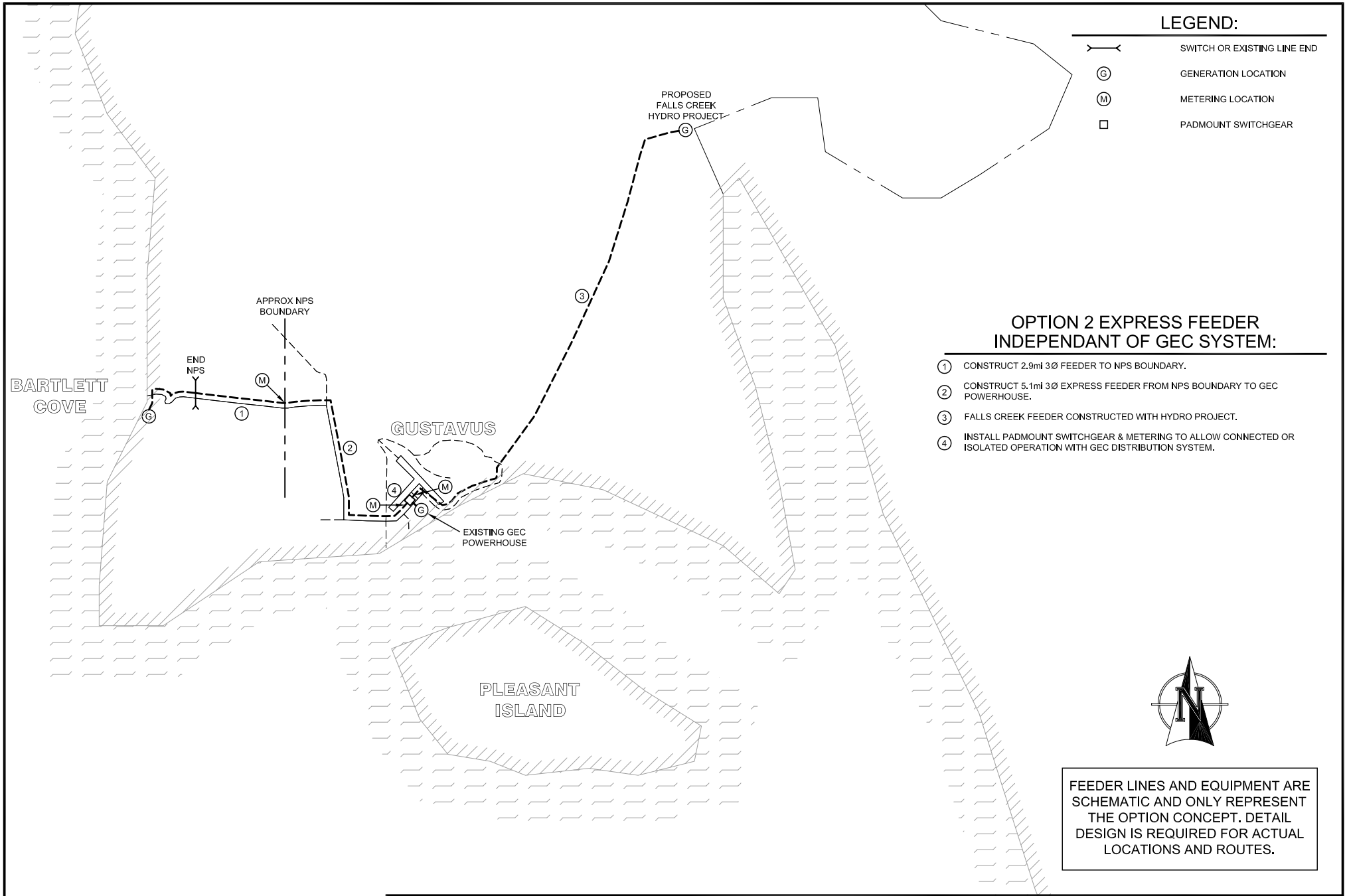
TABLE 9
Estimated Cost of Interconnection
Option 1: Transmit through GEC Distribution System

Item	Description	Quantity	Units	Unit Cost	Extended Cost
1	Extend Bartlett Cove electric system from MOST 5 to the NPS boundary	15,312	feet	$ 35	$ 535,900
2	Install pad mount, two-way metering system at NPS/GEC Boundary	1	lot	25,000	25,000
3	Extend feeder from NPS boundary to existing end of GEC system	6,864	feet	30	205,900
4	Install protective vacuum fault interrupter and protective relaying at system interface with automatic sectionalizing	1	lot	50,000	50,000
5	Rebuild GEC single phase system to three phase	9,504	feet	35	332,600
6	Install pad mount two-way metering system at Falls Creek Hydro Project	1	lot	25,000	25,000
7	Generation Control system Modifications at Bartlett Cove and GEC Powerhouse	1	lot	50,000	50,000
	Subtotal				$ 1,224,400
	Contingency			20%	$ 244,900
	Engineering Design			10%	122,400
	Total Cost				$ 1,591,700

Option 2: Express Feeder Independent of GEC Distribution System

Option 2 would involve the construction of an "express" feeder from the end of the Bartlett Cove system to the GEC powerhouse. This would allow for direct connection of the Bartlett Cove system to the Falls Creek project feeder. New switchgear would be installed at the GEC powerhouse that would allow for the GEC and Bartlett Cove systems to concurrently share the output of the Falls Creek project or separate the GEC distribution system if needed, and allow independent delivery of Falls Creek project power to the Bartlett Cove system. In this way, delivery of Falls Creek power would be unaffected by distribution system issues on either system. This option is illustrated in Exhibit B.

For Option 2, the Bartlett Cove system would be extended 2.9 miles to the NPS boundary. Then, an express feeder would be constructed 5.1 miles to the GEC powerhouse area. System metering would be installed at the GEC powerhouse to meter power deliveries from Falls Creek to Bartlett Cove and GEC. The new switchgear located in the GEC powerhouse would include breakers and protective bidirectional



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GLACIER BAY NATIONAL PARK
BARTLETT COVE ELECTRIC SYSTEM

EXHIBIT B
BARTLETT COVE/GEC INTERCONNECTION
OPTION 2

relays for each feeder allowing for separation of the systems. The protective relaying must include fault direction sensing along with system stability checks such as over and under voltage and frequency monitoring. Since all of the system switching is at one location, no remote communication between generation stations is needed. Both GEC and the Bartlett Cove generation controls would require modification to allow for hot standby and automatic start capability.

The express feeder option isolates the Bartlett Cove system from power quality issues and maintenance outages that may occur on the GEC distribution system. Option 2 is estimated to cost $2.0 million as shown in the following table.

TABLE 10
Estimated Cost of Interconnection
Option 2: Express Feeder to GEC Powerhouse

Item	Description	Quantity	Units	Unit Cost	Extended Cost
1	Extend Bartlett Cove electric system from MOST 5 to the NPS boundary	15,312	feet	$ 35	$ 535,900
2	Extend feeder from NPS boundary to GEC powerhouse	26,928	feet	30	807,800
3	Install pad mount protective vacuum fault interrupter switchgear and protective relaying at GEC powerhouse to allow for two way switching and automatic sectionalizing. Switchgear to include feeder metering and equal to S&C Vista switchgear.	1	lot	150,000	150,000
4	Generation Control system Modifications at Bartlett Cove and GEC Powerhouse	1	lot	50,000	50,000
	Subtotal				$ 1,543,700
	Contingency			20%	$ 308,700
	Engineering Design			10%	154,400
	Total Cost				$ 2,006,800

Interconnection Recommendation

DHA recommends that the NPS consider Option 2 as the best connection option. Although about 25% more costly than Option 1, Option 2 provides critical operation independence for both utility systems. If something were to go permanently wrong with the operations of either utility, Option 2 allows for the continued delivery of Falls Creek power to the other utility. Also with Option 2 the cost of on-going system maintenance can be clearly apportioned. Under Option 1 for instance, feeder upgrades that may be required on the GEC system may have both a Bartlett Cove power delivery component and a GEC system component. The allocation of those costs on an on-going basis could be a source of additional administrative cost and operational friction between the systems.

Under Option 2, maintenance responsibilities are clearly defined based on the physical location of necessary work. Option 2 also provides for better electrical isolation of the two distribution systems, and should over time result in a higher level of power quality being delivered to customers and users on both systems.

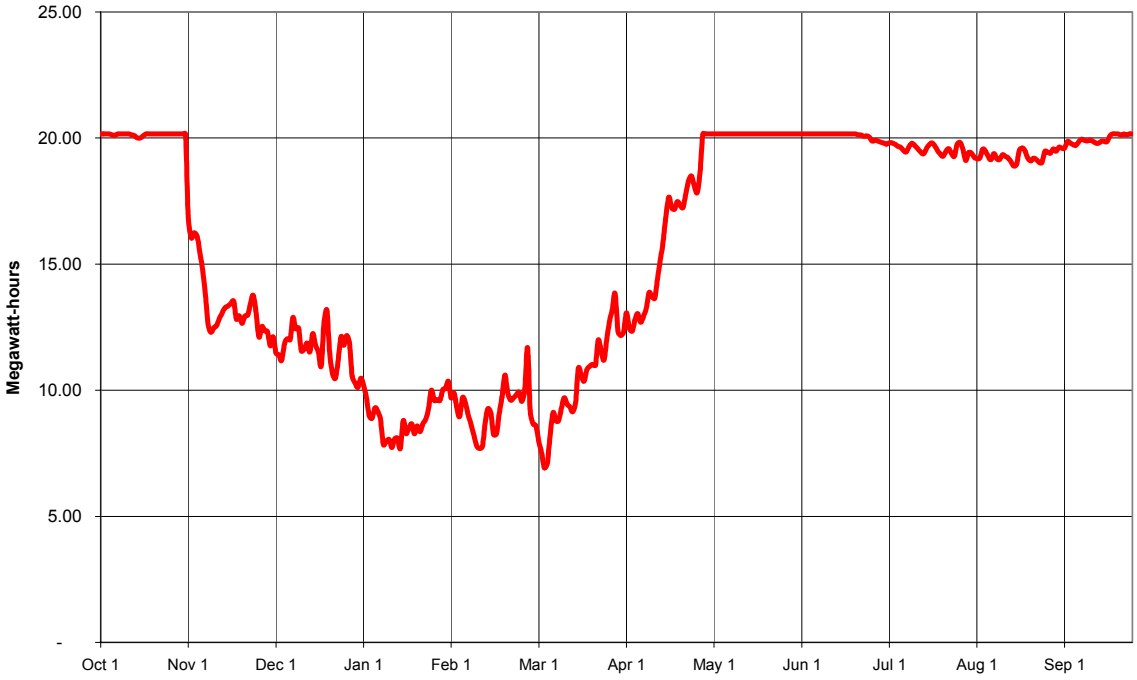
Availability of Falls Creek Power

The proposed Falls Creek hydroelectric project is to be located on Falls Creek, also known as the Kahtaheena River, about five miles east of the town of Gustavus. The project will consist of a 70-foot long, ten foot high diversion dam, an intake structure, a 9,000-foot long water conveyance pipeline, and a powerhouse with a single 800-kW turbine generator. Approximately five miles of buried transmission line will connect the Falls Creek project to the GEC diesel powerhouse in Gustavus. The project will be operated in run-of-river mode whereby the energy produced at any time is subject to water inflows at that time. The diversion dam will allow for short-term consistency in power production.

Estimates of the average energy generation capability of the Falls Creek project have been prepared by engineering consultants retained by GEC. Various alternatives were evaluated with regard to necessary water releases that would bypass the intake to the turbines. FERC in its Order Issuing License for the Falls Creek project dated October 29, 2004, accepted GEC's recommended minimum flow in the bypassed section of Falls Creek of 5-7 cubic feet per second (cfs). Based on this minimum flow requirement, the average annual energy generation capability of the Falls Creek project is estimated to be 5,725 MWh. This quantity of energy generation can only be realized with sufficient connected electric loads, however.

All hydroelectric generating plants are subject to variations in annual generation due to variations in local precipitation levels. Although the average annual generation capability of the Falls Creek project is estimated to be 5,725 MWh, annual energy generation capability is estimated to range between 4,740 MWh and 6,778 MWh under respective low and high water conditions. At 800-kW, the Falls Creek project is capable of generating about 20 MWh (20,000 kWh) each day. Average daily generation capability of the Falls Creek project over a full year is shown in Figure 7. Typically, the Falls Creek project is capable of generating at or near full capacity during the months May through October. Lower generation, due to lower water availability is expected in the winter months.

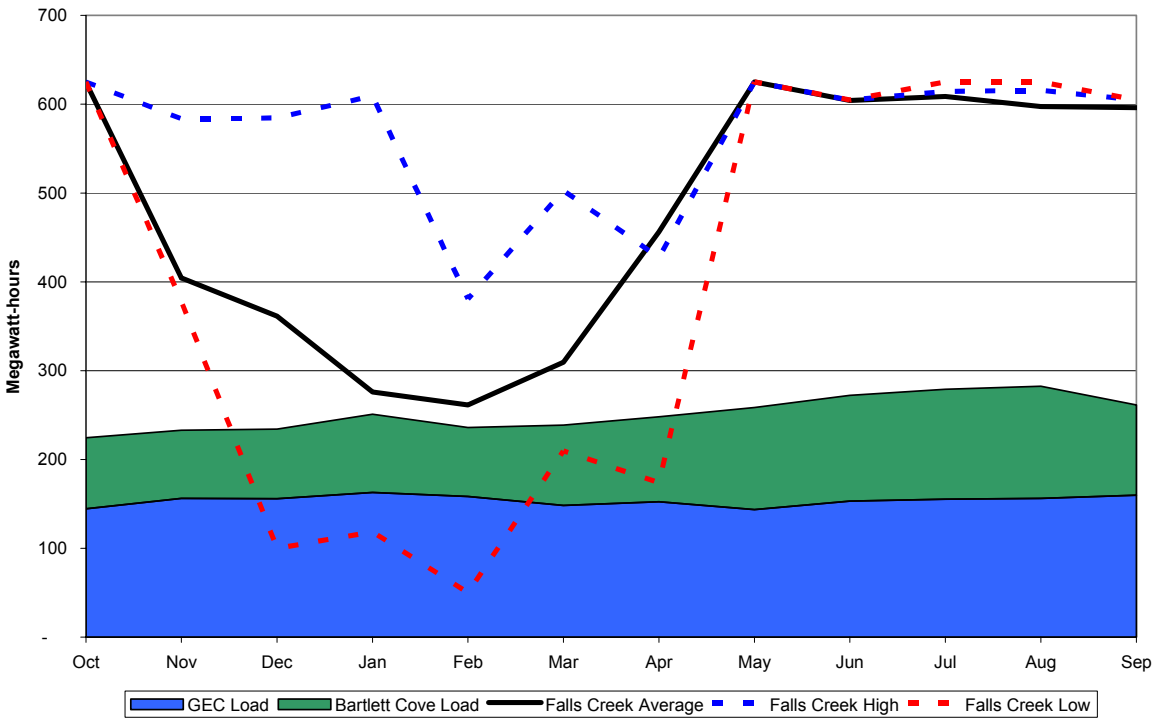
FIGURE 7
Falls Creek Hydroelectric Project
Average Daily Energy Generation Capability [1]
(MWh)



[1] Based on average water conditions.

If the Bartlett Cove electric system were connected to GEC, it would be expected that Falls Creek power would first be applied to GEC retail loads. Power surplus to the needs of GEC's customers would be available to Bartlett Cove. At current load levels and under average water conditions, the Falls Creek Project should be capable of supplying the combined loads of GEC and Bartlett Cove throughout the year. The variation in local precipitation from year to year must be factored in to projections of average "usable" energy from the Falls Creek Project. Figure 8 shows the projected monthly energy requirements of GEC and Bartlett Cove at current load levels and the monthly generation capability of the Falls Creek Project under average, high and low water conditions. With low water conditions, the output of the Falls Creek project in December, January and February would be only capable of supplying a portion of the GEC load. None of the Bartlett Cove load could be supplied during these months with low water conditions.

FIGURE 8
Estimated Monthly Use of Falls Creek Output
Average, High and Low Water Conditions [1]
(MWh)



[1] Based on current load levels for GEC and Bartlett Cove.

Because annual loads are not large enough to use the full capability of Falls Creek in high water years, the average energy generation that can actually be used by GEC and Bartlett Cove is less than the energy that is produced under average water conditions. Based on this limitation, a long range estimate of the average "usable" energy generation from Falls Creek has been developed for alternative medium, high and low load growth scenarios. This long range estimate is based on assumed medium, high and low annual growth rates for GEC of 2.0%, 4.0% and 1.0%, respectively.

Assuming that the Falls Creek Project begins operation in 2007, the average estimated "usable" energy available to GEC and Bartlett Cove is shown in Table 11 for the medium load growth scenario.

TABLE 11
Estimated GEC and Bartlett Cove Energy Requirements and Resources
Medium Load Growth Scenario
(MWh)

	2005	2006	2007	2008	2009	2010	2015	2020	2025
Bartlett Cove									
Energy Requirements	1,105	1,138	1,172	1,208	1,244	1,281	1,485	1,722	1,996
Energy Resources									
Hydro [1]	-	-	1,074	1,104	1,134	1,166	1,320	1,491	1,681
Diesel [2]	1,105	1,138	99	104	110	115	165	231	315
Total Resources	1,105	1,138	1,172	1,208	1,244	1,281	1,485	1,722	1,996
GEC									
Energy Requirements	1,775	1,810	1,847	1,883	1,921	1,960	2,163	2,389	2,637
Energy Resources									
Hydro [3]	-	-	1,784	1,818	1,853	1,888	2,075	2,277	2,500
Diesel [4]	1,775	1,810	63	65	68	71	89	112	138
Total Resources	1,775	1,810	1,847	1,883	1,921	1,960	2,163	2,389	2,637
Total Hydro Used	-	-	2,858	2,922	2,987	3,054	3,395	3,768	4,181

[1] Estimated net energy from Falls Creek hydroelectric project available to Bartlett Cove on an average annual basis.
[2] Diesel generation needed to supply remaining energy requirement.
[3] Estimated energy from Falls Creek hydroelectric project available to GEC on an average annual basis.
[4] Diesel generation needed to supply remaining energy requirement.

Estimated Cost of Power from GEC to Bartlett Cove

The cost of power to Bartlett Cove from GEC is subject to a number of factors. Discussions were conducted with GEC management to determine how an interconnection would work contractually. One option would be that power could be sold to Bartlett Cove at GEC's standard commercial tariff. Another option could be that the NPS pays a pro rata share of Falls Creek project annual costs based on the portion of the total project output used by Bartlett Cove in each year. With this option, the NPS would essentially be a participant in the Falls Creek project and could be required to pay for an agreed upon share of annual costs regardless of the actual output in a given year. This kind or arrangement is common in the electric utility industry for joint participation in power generation projects.

Based on information contained in the FEIS for the Falls Creek Project, with certain adjustments, the construction cost of the Falls Creek project is shown in Table 12.

TABLE 12
Estimated Development Costs of the Falls Creek Project [1]
(2005 Dollars)

Land and Land Rights		$	-
Mobilization and Logistics			82,000
Structures and Improvements			309,000
Reservoirs, Dams and Waterways			
Diversion/Intake Structure			464,000
Pipeline/Penstock			710,000
Tailrace Pipeline			171,000
Turbines and Generators			462,000
Accessory Electrical Equipment			143,000
Miscellaneous Electrical Equipment			158,000
Roads and Bridges			705,000
Substation Equipment and Structures			38,000
Transmission Line			286,000
Environmental Enhancements [2]			50,000
Subtotal		$	3,578,000
Licensing & Owners Admin Costs [3]			200,000
Contingencies	15.0%		537,000
Engineering	15.0%		524,000
Total		$	4,839,000
Less: AIDEA Grant [4]			(1,100,000)
Net Cost to be Financed		$	3,739,000

[1] Based on cost estimate prepared by GEC and included in the Falls Creek FEIS. Costs escalated from 2001 dollars to 2005 dollars using a combination of standard construction cost indices for hydroelectric construction between 2001 and 2004 and assumed cost escalation between 2004 and 2005. Estimate based on initial project operation in 2007.

[2] Assumed.

[3] Assumed.

[4] Grant amount to be provided by the Alaska Industrial Development and Economic Authority (AIDEA) provided Falls Creek Project is constructed.

The annual costs of the Falls Creek project will be comprised primarily of O&M costs and debt service (interest and principal) on the loan expected to be used to finance the net development costs after application of the AIDEA grant. Assuming that the Falls Creek project could be financed with loans at an interest rate of 6.5% over a repayment period of 30 years, the first year estimated annual cost of power from Falls Creek is shown in Table 13.

TABLE 13
Estimated First Year Annual Costs of the Falls Creek Project [1]

Operation and Maintenance	$	35,000
Insurance		12,500
Administrative and General		25,000
Renewals and Replacements		15,000
Debt Service [2]		313,000
Less: Interest Earnings [3]		(9,000)
Total Annual Cost	$	391,500
Estimated Energy Sales (MWh) [4]		2,858
Unit Cost (¢/kWh)		13.7

[1] Based on operating cost estimate prepared by GEC and included in the Falls Creek FEIS.

[2] Based on level debt service on loan for net financed amount shown in Table 12. Assumes 6.5% interest rate, a 30 year repayment period, debt service reserve of one year's interest and 2% financing expense associated with loan.

[3] Estimated interest earnings on amounts in the debt service reserve fund at a 3.5% annual interest rate.

[4] Based on first year energy generation estimated to be used by GEC and Bartlett Cove. See Table 11.

GEC's cost of capital would potentially be higher than 6.5% if the Falls Creek project were partly equity financed. Debt financing for hydroelectric projects is common in the electric utility industry. The initial year unit costs shown in Table 13 would be expected to decrease over time as the GEC and Bartlett Cove loads increase and greater average utilization of the Falls Creek output can be achieved.

If a power purchase contract could be arranged so that Bartlett Cove would purchase power from GEC at a rate comparable to the cost shown in Table 13, the annual cost of electric service in Bartlett Cove would be as shown in Table 14. Costs shown in Table 14 are based on Bartlett Cove continuing to supply its energy requirement net of purchased hydroelectric energy with its diesel generators. The costs shown in Table 14 are also based on the assumption that the NPS will pay for the costs of interconnecting to GEC (Option 2 with Express Feeder) and depreciate the interconnection cost over a 30 year period[12].

[12] The 30 year depreciation period is reflective of the longer useful life of transmission and distribution facilities as compared to diesel generators.

TABLE 14
Bartlett Cove Projected Annual Cost of Power
Interconnection Case with Purchase of Hydroelectric Power
(Medium Load Growth Scenario, Medium Fuel Price Scenario)

	2005	2010	2015	2020	2025	2030
Fuel Cost ($/gal) [1]	$ 1.30	$ 1.51	$ 1.75	$ 2.03	$ 2.35	$ 2.72
Fuel Handling ($/gal) [2]	$ 0.300	$ 0.339	$ 0.384	$ 0.434	$ 0.492	$ 0.556
Diesel Gen. (MWh) [3]	1,105	115	165	231	315	434
Fuel (gallons 000) [4]	82	9	12	17	23	32
Hydro Energy (MWh) [5]	-	1,166	1,320	1,491	1,681	1,880
Production Expense ($000)						
Fuel	$ 107	$ 13	$ 21	$ 35	$ 55	$ 88
Fuel Handling	25	3	5	7	11	18
O&M [6]	60	34	38	43	49	56
Major Maintenance [7]	20	7	8	10	11	12
Subtotal	$ 211	$ 57	$ 73	$ 95	$ 126	$ 174
Purchased Power [8]	$ -	$ 155	$ 163	$ 172	$ 181	$ 190
Depr. - Generators [9]	7	7	4	3	-	-
Depr. - Intertie [10]	-	67	67	67	67	67
Indirect Charge [11]	33	43	46	51	56	65
Total Cost	$ 251	$ 330	$ 353	$ 387	$ 430	$ 495
Unit Cost (¢/kWh) [12]	22.7	25.7	23.8	22.5	21.6	21.4

[1] Includes 3.0% annual escalation applied to initial assumed fuel price (0.5% over assumed general inflation.)

[2] Based on cost allocated to electric system in 2004. Includes assumed annual inflation.

[3] Total energy generation requirement at Bartlett Cove net of hydroelectric energy. See Table 7.

[4] Based on average fuel consumption of 0.0743 gallons per kWh (13.45 kWh per gallon).

[5] Estimated energy purchased from GEC. See Table 11.

[6] Based on existing allocation of maintenance labor costs estimated to be reduced by 50% with GEC interconnection. Includes assumed general inflation.

[7] Based on existing level of expenditure estimated to be reduced by two-thirds with GEC interconnection. Includes assumed general inflation.

[8] Cost of purchased hydroelectric power assuming allocation of annual costs shown in Table 13 based on proportion of Falls Creek energy to be used by Bartlett Cove in any particular year.

[9] Depreciation charges on diesel generators based on a 15-year depreciation period. No new diesel generators are expected to be needed with majority of Bartlett Cove energy requirement supplied by Falls Creek.

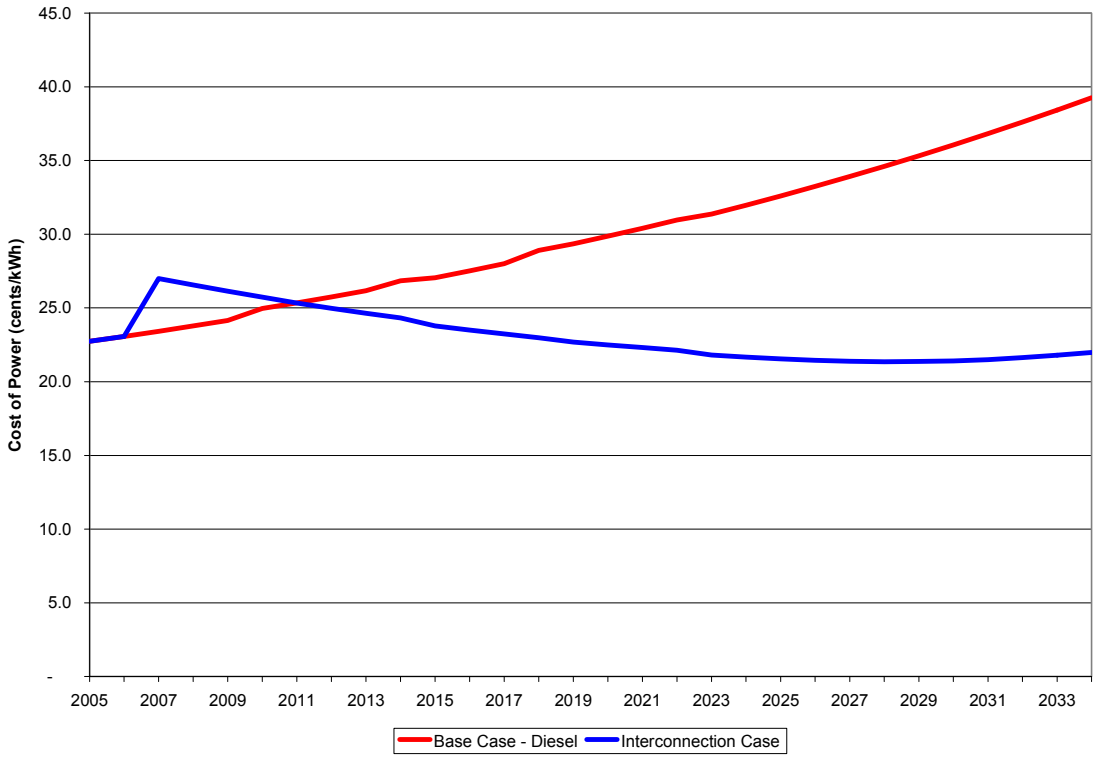
[10] Depreciation charges associated with cost of interconnection to GEC system estimated at $2,006,800 based on 30 year depreciation period.

[11] Based on 15% of direct costs per established NPS policy.

[12] Total cost divided by sum of diesel generation and hydro energy.

Figure 9 provides a graphical comparison of the costs of electric service at Bartlett Cove between the Base Case and the Interconnection Case.

FIGURE 9
Estimated Annual Cost of Electric Service at Bartlett Cove
Base Case Compared to Interconnection Case [1]
(Medium Load Growth, Medium Fuel Price)
(cents/kWh)



[1] See Table 8 and Table 14. Interconnection Case assumes purchase of Falls Creek power at a price similar to that shown in Table 13.

As shown in Figure 9, although the cost of electric service at Bartlett Cove would be higher initially with the Interconnection Case, a crossover occurs in 2011 and costs would then be lower with the Interconnection Case. It is important to note that the cost data reflected in Figure 9 changes with the alternative high and low load growth scenarios and with the high and low fuel price scenarios. It is also important to note that the cost of electric service with the Interconnection Case could be significantly different than shown in Table 14 and Figure 9 with contract arrangements between GEC and the NPS different than what has been assumed and described in this section of the report.

Comparison of Costs

The estimated cost of electric service at Bartlett Cove has been estimated on an annual basis for a 30-year projection period for each of the fuel price and load growth scenarios previously described. The cumulative net present value of annual costs over the projection period has been derived and is compared among the various cases. For the

purpose of this calculation, a discount rate of 6% has been used. The cumulative net present value amounts are shown in Table 15.

TABLE 15
Cumulative Net Present Value of Bartlett Cove Projected Annual Cost of Electric Service
Diesel Case Compared to Interconnection Case
($000)

	Assumed Conditions		Cumulative Net Present Value of Annual Costs [1] ($000)		
			Base (Diesel)	Interconnection	Savings with
Scenario	Load Growth	Fuel Price	Case [2]	Case [3]	Interconnection
1	Medium	Medium	$ 6,126	$ 4,983	$ 1,143
2	Medium	High	6,968	5,139	1,829
3	Medium	Low	5,383	4,843	540
4	High	Medium	7,692	6,145	1,547
5	High	High	8,885	6,631	2,254
6	High	Low	6,649	5,730	919
7	Low	Medium	5,284	4,677	607
8	Low	High	5,941	4,777	1,164
9	Low	Low	4,700	4,586	114

[1] Cumulative present value of total annual costs over the 30-year projection period, 2005 through 2034. Assumes a 6.0% annual discount rate.

[2] Assumes continued diesel generation to supply Bartlett Cove power requirements.

[3] Assumes Bartlett Cove interconnection with GEC and purchase of available hydroelectric power. Diesel generation at Bartlett Cove is used to supply remaining Bartlett Cove power requirements.

The results of the cost comparison as shown in Table 15 indicate that there are net present value savings to Bartlett Cove with interconnection in all scenarios.

Comparison of Costs at GEC Retail Rates

The approach taken in this study has been that the electric system at Bartlett Cove would continue to be owned by the NPS and that interconnection with GEC would primarily serve only as a means to obtain hydroelectric power to supplant most of the diesel generation at Bartlett Cove. This approach would allow the NPS to retain responsibility and control over most decisions related to electric service in Bartlett Cove, particularly with regard to reliability and quality of service. Potentially, however, the NPS could pursue electric service as a retail commercial customer of GEC. Under this scenario, GEC would most likely supply the full power requirements of Bartlett Cove, maintain the Bartlett Cove electric distribution system and bill the NPS for power consumption in accordance with GEC's approved tariffs. GEC has two rate schedules, one for residential and small commercial service and the other for commercial customers utilizing over 1,000 kWh per month. GEC's rates are summarized in the following table.

TABLE 16
GEC Electric Rates Effective July 26, 2004 [1]

	Meter Charge ($/month)	Energy (¢/kWh)	Demand ($/kW/month)
Schedule No. 1 (Residential and Small Comm.)	$ 12.00	52.0	First 3 kW, no charge Next 7 kW, $6.00 per kW Over 10 kW, $10.00 per kW
Schedule No. 2 (Comm. over 1,000 kWh)	$ 12.00	39.0	Same as for Schedule 1.

[1] Source: GEC filing with Regulatory Commission of Alaska dated July 26, 2004. Excludes fuel surcharge or credit which applies when fuel prices vary from the price used in developing the base rates. The base cost of power used in GEC's current rates is 16.06 cents per kWh.

The State of Alaska subsidizes residential electric bills through its Power Cost Equalization (PCE) program. The PCE credit, which was about 30 cents per kWh for GEC customers in October 2004, is applied to the first 500 kWh of energy purchased each month to lower the net bill to the residential customer. The PCE credit does not apply to commercial customers.

Based on the Schedule No. 2 rates shown in Table 16 and the power requirements at Bartlett Cove in 2003, the total cost that would have been incurred if electric service were provided by GEC is $396,974. Compared to the cost incurred by the NPS to provide its own electric service of $186,691 in 2003, $210,283 more would have been spent to receive electric service from GEC in 2003. It is also estimated that the Park Concession would have been charged $96,934 in 2003 if it had been a customer of GEC, compared to Park charges to the Concession of approximately $42,400 in 2003. These comparisons are limited, however, since if Bartlett Cove had been a retail customer of GEC, GEC should have been able to lower its electric rates to all customers. Further, depending on the terms and conditions associated with GEC serving Bartlett Cove[13], GEC might be able to establish a special "large commercial" tariff with a lower cost of energy that could apply to Bartlett Cove energy sales.

[13] Large commercial or industrial electric customer classification is typically differentiated from other customer classifications by delivery voltage and customer ownership of certain distribution related facilities. If the NPS were to continue to own and maintain the electric distribution system in Bartlett Cove, GEC would not have these costs in its rate base. As a result, the unit cost for GEC to serve Bartlett Cove would be less than other customers on the GEC system and the rate charged to Bartlett Cove should reflect this.

Section 4
Estimated Cost Impacts on Local Electric Rates

Introduction

GEC has some of the highest retail electric rates in the State. One of the reasons for the high electric rates is the cost of diesel generation to supply the power requirement. Generation fuel is delivered to Gustavus by barge, stored in tanks located near the dock and transferred to the powerhouse fuel tanks by truck as needed. With its proposed development of the Falls Creek hydroelectric project, GEC will eliminate much of its need for diesel generation. In the near-term, however, the cost of power from the Falls Creek project will not necessarily be much lower than the cost of power from diesel generators. This is due to the high fixed costs, mostly interest and depreciation, associated with the hydroelectric project.

If electric service at Bartlett Cove was provided by GEC, the fixed costs of GEC's electric system could be allocated over a larger sales base. This would potentially lower the cost of electric service to all GEC customers depending, of course, on what rate Bartlett Cove paid for its electric service from GEC.

The purpose of this section of the report is to provide an estimate of the potential rate impacts that the community of Gustavus could realize if Bartlett Cove were a customer of GEC. A detailed evaluation of this type is dependent on a number of factors that are beyond the limited scope of this study. Further, the uncertainty of GEC's operating costs in the future, particularly with regard to the Falls Creek project, adds to the difficulty in projecting rate impacts. As a result, it should be understood that additional analysis will be needed, presumably with significant planning and rate policy input from GEC, if retail rate impacts are to be fully defined.

Estimated GEC Rate Impacts

There are two general concepts that have been evaluated with regard to the impacts on GEC rates. First, if Bartlett Cove were to become a retail customer of GEC, the whole revenue structure of GEC would be affected. Second, if Bartlett Cove purchases Falls Creek power in the manner defined previously in this report, a significant portion of the fixed costs of the Falls Creek project will be paid by the NPS. With all else held equal, this should reduce GEC's net revenue requirement to be recovered through sales to its existing customers. Estimates of rate impacts for both of these concepts have been made.

In 2003, GEC sold 1,506,758 kWh to its 473 retail customers. Total revenues from energy sales in 2003 were $772,138 representing average unit revenues of 51.2 cents per kWh. Average electric energy use was 2,402 kWh per residential customer in 2003 (200 kWh per month) which reflects the high cost of electricity in the community as well as

the 500 kWh per month limit to which the State's PCE subsidy applies. As a comparison, residential customers in Juneau[14] used an average of 10,017 kWh per customer during 2003 (834 kWh per month). The average cost of power to residential customers in Juneau was 9.5 cents per kWh in 2003. Customer, energy sales and revenue data for GEC for the years 2000 through 2003 are shown in the following table.

TABLE 17
GEC Historical Customers, Energy Sales and Revenues [1]

	2000	2001	2002	2003
Number of Customers (Average)				
Residential	312	327	345	365
Commercial	78	79	78	80
Community	6	6	6	6
Government	18	21	22	22
Total	414	433	451	473
Energy Sales (kWh)				
Residential	826,804	817,018	827,303	876,645
Commercial	391,921	328,691	352,626	361,833
Community	34,830	31,795	32,783	32,783
Government	214,534	199,460	187,384	235,497
Total	1,468,089	1,376,964	1,400,096	1,506,758
Usage per Customer (kWh)				
Residential	2,650	2,499	2,398	2,402
Commercial	5,025	4,161	4,521	4,523
Community	5,805	5,299	5,464	5,464
Government	11,919	9,498	8,517	10,704
Total	3,546	3,180	3,104	3,186
Revenue				
Residential	$ 411,871	$ 483,627	$ 447,259	$ 472,487
Commercial	163,638	173,548	163,512	163,969
Community	16,185	17,825	16,823	16,766
Government	99,769	112,263	96,695	118,916
Total	$ 691,463	$ 787,263	$ 724,289	$ 772,138
Unit Revenue (cents/kWh)				
Residential	49.8	59.2	54.1	53.9
Commercial	41.8	52.8	46.4	45.3
Community	46.5	56.1	51.3	51.1
Government	46.5	56.3	51.6	50.5
Total	47.1	57.2	51.7	51.2

[1] Source: GEC. Residential revenues shown do not include PCE credits.

A comparison of average electric charges for several communities in Southeast Alaska is shown in Table 18. The Base Charge shown in Table 18 is reasonably reflective of the monthly charge to electric consumers for which PCE credits do not apply, such as small commercial customers, for 500 kWh of electricity in the respective communities.

[14] Electric service is provided in the greater Juneau area by the Alaska Electric Light & Power Company (AEL&P). AEL&P obtains most of its power supply requirement from hydroelectric generating facilities.

TABLE 18
Comparative Average Residential Monthly Charge for 500 KWh [1]

Community	Electric Utility	Base Charge	PCE Benefit	Net Charge
Gustavus	Gustavus Electric Co.	$ 252.40	$ (118.70)	$ 133.70
Angoon	Inside Passage Electric Cooperative	163.75	(64.60)	99.15
Cordova	Cordova Electric Cooperative	168.70	(36.50)	132.20
Haines	Alaska Power Company	88.30	(14.75)	73.55
Hoonah	Inside Passage Electric Cooperative	163.75	(64.60)	99.15
Skagway	Alaska Power Company	88.30	(14.75)	73.55
Yakutat	Yakutat Power	159.35	(30.75)	128.60
Juneau	Alaska Electric Light & Power	54.60	-	54.60
Ketchikan	Ketchikan Public Utilities	49.75	-	49.75
Petersburg	Petersburg Municipal P&L	59.98	-	59.98
Sitka	Sitka Municipal Electric Dept.	50.75	-	50.75

[1] Based on rates provided in Statistical Report of the Power Cost Equalization Program for Fiscal Year 2004 prepared by the Alaska Energy Authority for PCE utilities and on utility rate schedules for non-PCE utilities.

GEC indicated in a rate adjustment filing with the Regulatory Commission of Alaska (RCA) in July 2004 that its estimated annual cost structure for its "2002 test year" is as follows:

TABLE 19
GEC Test Year 2002 Revenues and Expenses [1]

Revenue	
Meter Charge	$ 64,703
Energy Charge	
Rate 1 - Res, Sm. Com.	625,366
Rate 2 - Lg Comm.	86,034
Subtotal - Energy	$ 711,400
Demand Charge	9,004
Subtotal - Rev from Sales	$ 785,107
Other	16,626
Total Revenue	$ 801,733
Operating Expenses	
Fuel	$ 205,142
O&M - Generation	27,511
Subtotal - Gen	$ 232,653
O&M - Distribution	349,195
Interest	25,848
Depreciation	55,000
Total Operating Expenses	$ 662,696
Net Income	$ 139,037
Total Sales (kWh)	1,423,228
Unit Revenue (¢/kWh)	55.2

[1] Source: GEC rate filing July 26, 2004, exhibits GEC-4 and GEC-6.

Based on the data shown in Table 18, it is estimated that if Bartlett Cove were to obtain electric service from GEC, the average unit revenue from energy sales for GEC would decrease to 37.2 cents per kWh, representing a decrease of 33%. A significant portion of this reduction, however, would reflect the fact that Bartlett Cove would be a large commercial customer that should be served at a rate considerably below the residential and small commercial rate. Assuming that Bartlett Cove would pay a rate of 30.0 cents per kWh as a large, primary voltage customer, the other customers on GEC's system would only realize a reduction in electric rates estimated to be about 15%.

The estimated reduction to GEC rates above assumes that the NPS would pay the cost of the interconnection between Bartlett Cove and GEC. If GEC were to pay the cost of the interconnection, the rate charged to Bartlett Cove would need to be higher to cover the additional interest and depreciation expense related to the interconnection.

A further consideration is that any reduction in GEC's residential rate would probably not provide much benefit to the end consumer because of the provisions of the State's PCE program. At the present time, the PCE credit provided to GEC residential customers is approximately 30 cents per kWh. A reduction of 30 cents per kWh or less would potentially reduce the total amount of subsidy the State needs to provide to GEC residential customers. The average residential customer consuming less than 500 kWh per month would not realize any reduction in the cost of electric service, however.

As shown in Table 13, the estimated annual cost associated with the Falls Creek Project is $391,500. Without Bartlett Cove as a user of a portion of the output of Falls Creek, GEC would need to pay this cost on its own[15] and would presumably recover the necessary revenue through the rates charged to its customers. If the cost of $391,500 were to be recovered only by GEC and annual hydroelectric energy used by GEC was 1,400,000 kWh, GEC's current load, the unit cost of power from Falls Creek to GEC would be 27.9 cents per kWh. This cost exceeds GEC's approximately 16.1 cents per kWh for diesel generation, as reported in its recent rate filing, which could make financial justification of the Falls Creek Project more difficult.

If Bartlett Cove were to purchase hydroelectric power from GEC consistent with the approach defined in Section 3 of this report (i.e. as a purchaser of wholesale power from Falls Creek at cost), it is estimated that approximately 38% or $148,800 of the total annual cost of the Falls Creek project would be paid by the NPS. Based on GEC's total estimated current annual energy sales of approximately 1,400,000 kWh, the estimated reduction resulting from Falls Creek energy sales to Bartlett Cove is 10.6 cents per kWh.

[15] GEC has indicated that it would only install a 600-kW turbine at Falls Creek if Bartlett Cove were not connected, rather than an 800-kW turbine. This turbine size reduction, however, is not expected to significantly affect the total annual costs of the project.

APPENDIX A

Bartlett Cove Electric System
Historical Costs of Electric Service

(Source: NPS Cost and Data Reports.)

	Fiscal Year Ending September 30					
	2004	2003	2002	2001	2000	1999
Total Generation (KWh)	1,072,886	977,473	1,000,898	858,991	842,148	825,756
Fuel Use (gallons)	79,585	72,778	74,586	64,363	64,279	63,749
Fuel Use (kWh/gallon)	13.5	13.4	13.4	13.3	13.1	13.0
Average Fuel Cost ($/gallon)	$ 1.4500	$ 1.0700	$ 0.8458	$ 1.0621	$ 0.8419	$ 0.7460
Fuel Handling ($/gallon)	$ 0.3010	$ 0.0733	$ 0.1019			
Lube Oil Use (gallons)	321	294	268	260	284	271
Average Lube Oil Cost ($/gallon)	$ 3.45	$ 4.07	$ 2.81	$ 2.90	$ 4.31	$ 5.25
Operating Expenses						
Fuel	$ 115,398	$ 77,872	$ 63,085	$ 68,361	$ 54,116	$ 47,557
Fuel Handling and Storage	23,955	5,335	7,600	-	-	-
Subtotal - Fuel	$ 139,353	$ 83,207	$ 70,685	$ 68,361	$ 54,116	$ 47,557
Lube Oil	1,108	1,197	753	753	1,224	1,424
Supplies & Materials	2,584	10,582	3,590	3,537	-	5,649
Generator Repairs	-	11,958	-	-	-	-
Cyclic Maintenance	4,914	-	2,243	2,243	2,243	-
Operations & Maintenance Labor	22,773	43,761	17,844	19,675	19,235	21,329
Subtotal - Operating Expenses	$ 170,732	$ 150,705	$ 95,115	$ 94,569	$ 76,818	$ 75,959
GSA Vehicle Cost	3,704	4,797	5,027	5,041	4,595	4,572
Depreciation Expense						
Generators	6,838	6,838	5,625	5,625	5,625	5,625
Other	-	-	-	-	-	-
Subtotal - Depreciation	$ 6,838	$ 6,838	$ 5,625	$ 5,625	$ 5,625	$ 5,625
Indirect Cost (15%)	27,191	24,351	15,865	15,785	13,056	12,923
Total Cost of Production	$ 208,465	$ 186,691	$ 121,632	$ 121,020	$ 100,094	$ 99,079
Unit Cost of Production (¢/kWh)	19.4	19.1	12.2	14.1	11.9	12.0
Average Fuel Cost ($/gallon)	1.45	1.07	0.85	1.06	0.84	0.75
Production Cost Summary						
Fuel, Storage, Handling	$ 139,353	$ 83,207	$ 70,685	$ 68,361	$ 54,116	$ 47,557
Non-Fuel O&M	31,379	67,498	24,430	26,208	22,702	28,402
Depreciation	6,838	6,838	5,625	5,625	5,625	5,625
Indirect Cost (A&G)	30,895	29,148	20,892	20,826	17,651	17,495
Total	$ 208,465	$ 186,691	$ 121,632	$ 121,020	$ 100,094	$ 99,079
Production Cost Summary (¢/kWh)						
Fuel	12.99	8.51	7.06	7.96	6.43	5.76
Non-Fuel O&M	2.92	6.91	2.44	3.05	2.70	3.44
Depreciation	0.64	0.70	0.56	0.65	0.67	0.68
Indirect Cost (A&G)	2.88	2.98	2.09	2.42	2.10	2.12
Total	19.43	19.10	12.15	14.09	11.89	12.00

APPENDIX A

Bartlett Cove Electric System
Historical Costs of Electric Service

(Source: NPS Cost and Data Reports.)

	Fiscal Year Ending September 30				
	1998	1997	1996	1995	1994
Total Generation (KWh)	747,375	830,412	862,881	841,479	648,000
Fuel Use (gallons)	57,690	63,918	66,603	66,235	60,137
Fuel Use (kWh/gallon)	13.0	13.0	13.0	12.7	10.8
Average Fuel Cost ($/gallon)	$ 0.7450	$ 0.8886	$ 0.9100	$ 0.9000	$ 0.9500
Fuel Handling ($/gallon)					
Lube Oil Use (gallons)	484		344	326	
Average Lube Oil Cost ($/gallon)	$ 5.61		$ 4.94	$ 5.00	
Operating Expenses					
Fuel	$ 42,979	$ 56,798	$ 60,609	$ 59,611	$ 57,130
Fuel Handling and Storage	-	-	-	-	-
Subtotal - Fuel	$ 42,979	$ 56,798	$ 60,609	$ 59,611	$ 57,130
Lube Oil	2,715	-	1,699	1,630	-
Supplies & Materials	16,714	17,099	9,647	9,658	8,724
Generator Repairs	-	5,080	7,648	12,000	-
Cyclic Maintenance	-	-	10,000	-	10,000
Operations & Maintenance Labor	32,456	29,866	32,125	18,456	27,614
Subtotal - Operating Expenses	$ 94,864	$ 108,843	$ 121,729	$ 101,355	$ 103,468
GSA Vehicle Cost	3,089	2,692	2,692	1,432	1,226
Depreciation Expense					
Generators	5,625	5,625	5,625	-	-
Other	-	-	-	33,000	2,133
Subtotal - Depreciation	$ 5,625	$ 5,625	$ 5,625	$ 33,000	$ 2,133
Indirect Cost (15%)	15,537	17,574	19,507	20,368	16,024
Total Cost of Production	$ 119,115	$ 134,734	$ 149,553	$ 156,155	$ 122,851
Unit Cost of Production (¢/kWh)	15.9	16.2	17.3	18.6	19.0
Average Fuel Cost ($/gallon)	0.75	0.89	0.91	0.90	0.95
Production Cost Summary					
Fuel, Storage, Handling	$ 42,979	$ 56,798	$ 60,609	$ 59,611	$ 57,130
Non-Fuel O&M	51,885	52,045	61,120	41,744	46,338
Depreciation	5,625	5,625	5,625	33,000	2,133
Indirect Cost (A&G)	18,626	20,266	22,199	21,800	17,250
Total	$ 119,115	$ 134,734	$ 149,553	$ 156,155	$ 122,851
Production Cost Summary (¢/kWh)					
Fuel	5.75	6.84	7.02	7.08	8.82
Non-Fuel O&M	6.94	6.27	7.08	4.96	7.15
Depreciation	0.75	0.68	0.65	3.92	0.33
Indirect Cost (A&G)	2.49	2.44	2.57	2.59	2.66
Total	15.94	16.23	17.33	18.56	18.96