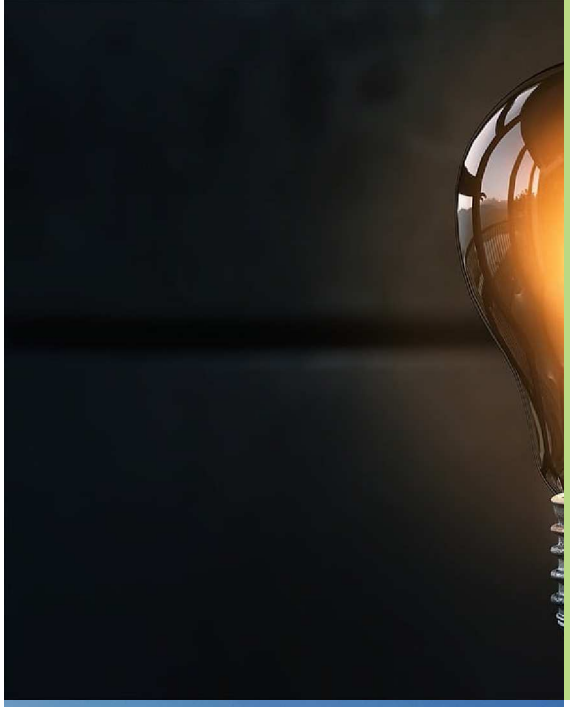
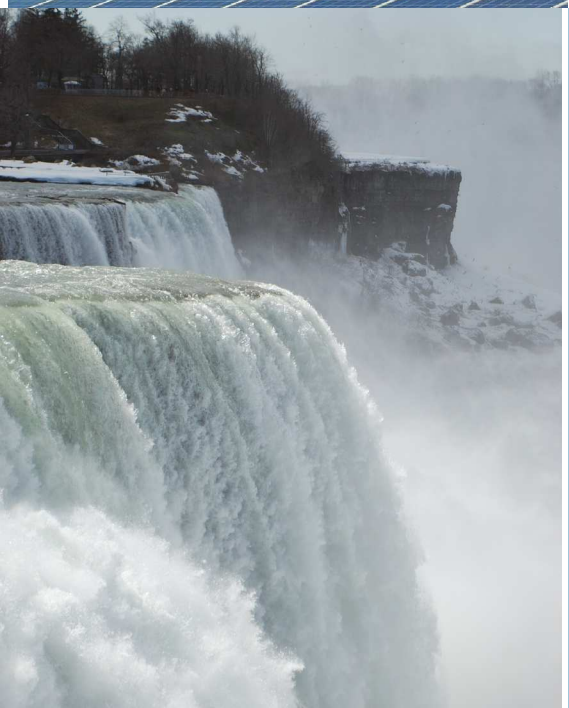


2023 Chilkat Valley Energy Outlook

An energy analysis of our current usage and future considerations.



HEDC
Haines Economic Development Corp.

Table of Contents

Introduction

The Chilkat Valley is one of the five rural Southeast Alaska communities served by Inside Passage Electric Cooperative (IPEC), a non-profit, consumer owned electric utility. IPEC purchases power from Alaska Power Company (APC), a privately owned electric utility that operates diesel generators and hydroelectric plants in the region.

APC provides electric generation, transmission, and distribution services in twenty-nine communities and villages, which includes less than 8,300 electric customers spread across more than 1,100 miles in Alaska. APC's parent company is AP&T. AP&T is the parent company for a variety of subsidiary companies engaged in regulated, non-regulated, and development-phase electrical power and telecommunication services. Power sector subsidiaries currently owned and operated by AP&T include: Alaska Power Company ("APC"); Goat Lake Hydro, Inc. ("GLH"); and BBL Hydro, Inc. Additionally, AP&T is the 50% owner of Haida Energy Inc. ("HEI"), a hydroelectric based power producer for the Prince of Wales service area. AP&T is also the 50% owner of Ketchikan Electric Company ("KEC").

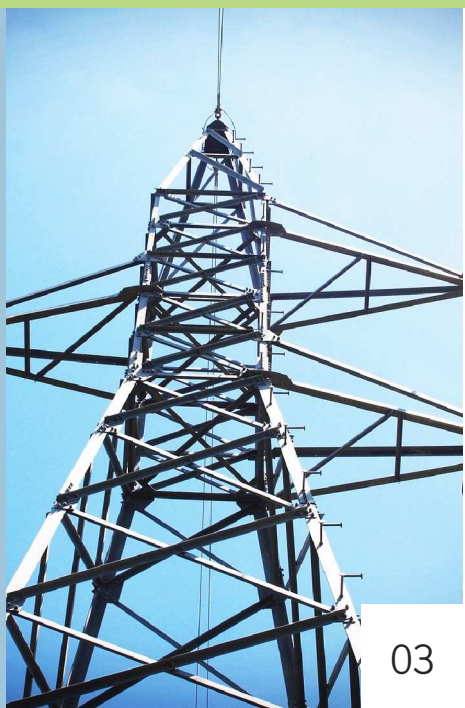
The Chilkat Valley receives its energy from Inside Passage Electric Cooperative ("IPEC") in Rate Group 1 (Skagway and Haines).

Rate Group 1 includes 2,858 customers within the communities of Skagway, Haines, Dyea, and Lutak. In Rate Group 1, APC resells energy supplied by GLH, and generates power using APC's Dewey Lakes and Lutak hydropower projects, plus APC-owned diesel generators (1, Rice)

Hydroelectric Generation

The main source of power provided by APC for the Chilkat Valley is the Skagway hydroelectric project, which consists of two dams and two powerhouses on the Taiya River. These are the
4MW Goat Lake hydropower project and the 3MW Kasidaya Creek hydropower project. GLH also owns an 18-mile submarine power cable system interconnecting the communities of Haines and Skagway. APC-owned hydro and diesel generation facilities provide any additional power required in this service area.

As the town's energy needs potentially expands and evolves, a variety of considerations must be considered for the future.



Power Generation Breakdown

The Skagway Hydroelectric project has a capacity of 8.5 megawatts and provides renewable energy to Skagway, Haines, and Klukwan. However, the hydroelectric output varies depending on the water levels and seasonal demand. When the hydro power is insufficient, APC supplements it with diesel generation from its Haines plant, which has a capacity of 4.5 megawatts. Currently, the plant showcases a 90% hydropower output, supplemented by 10% diesel, an increase from 2013 data (2, Custer)

4MW
Goat Lake hydropower project

3MW
Kasidaya Creek Hyropower project

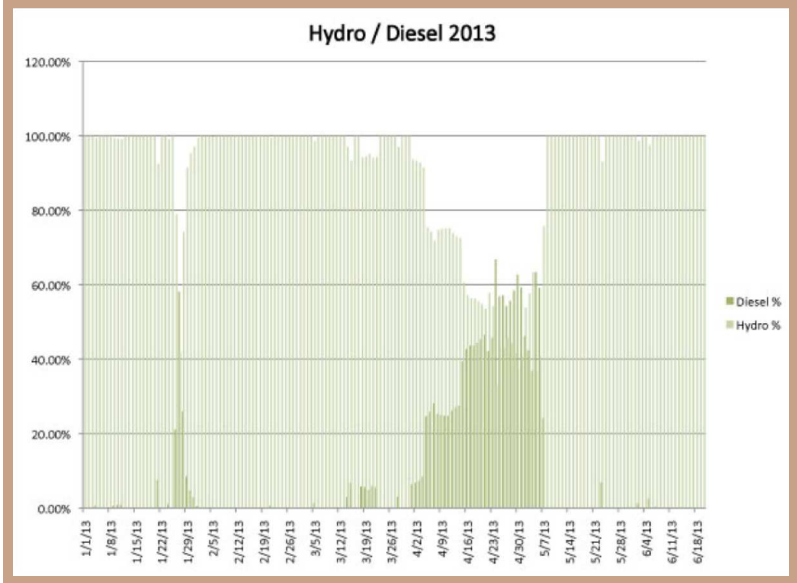
90%
Average Hyropower

Energy Use Trends

The energy usage trend in Haines is influenced by several factors, such as the availability of hydroelectric power, the demand for electricity, and the weather conditions. Based on the information from EIA (US Energy Information Administration), here are some observations on trends:

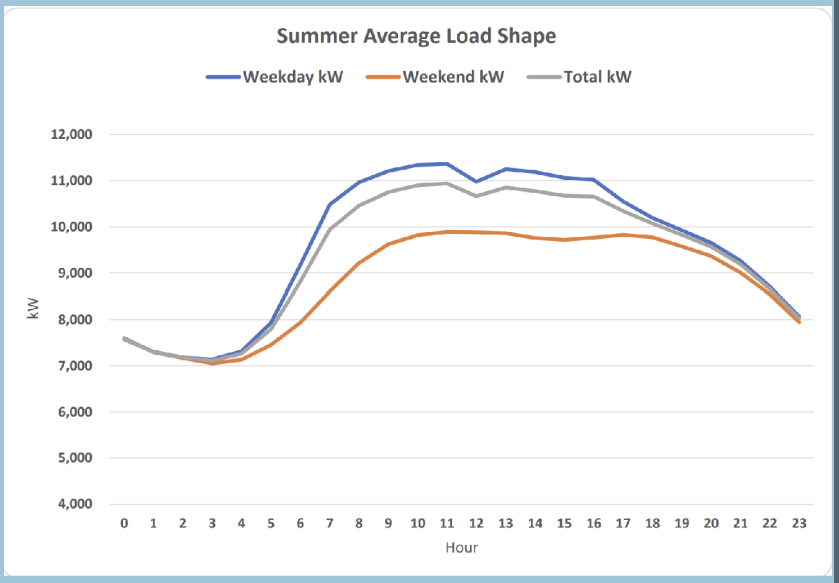
1) The percentage of hydroelectric power used to generate electricity for Haines varies throughout the year, depending on the water levels in the Taiya River and the seasonal demand. Generally, hydro power is higher in the summer and lower in the winter, when diesel generators are used to supplement the power supply (2).

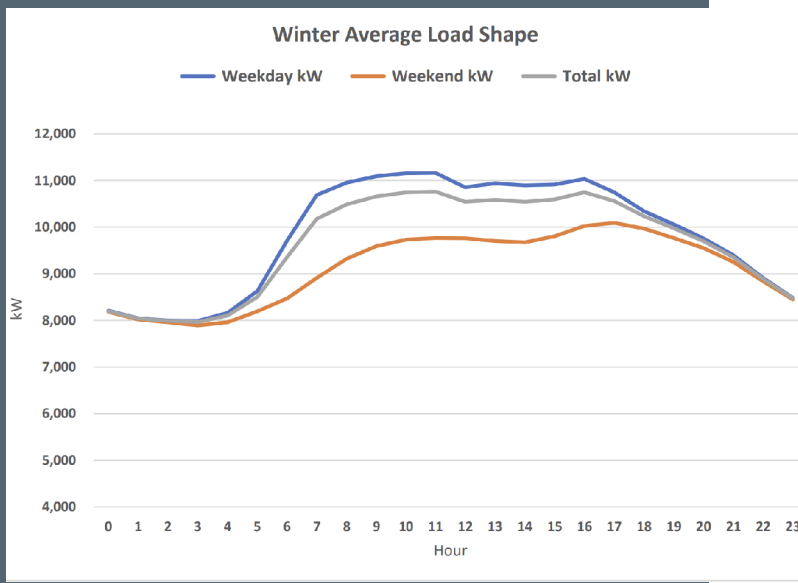
2) The total electricity consumption in Haines also fluctuates seasonally, with higher peaks in the winter and lower valleys in the summer. This is likely due to the colder temperatures and longer nights in the winter, which increase the need for heating and lighting (3, EIA)



Hydro/Diesel 2013 (Haines, 4)

Summer vs. Winter Load Shapes





(Tomczyk,5)

Diesel Usage and Cost

During times of low hydroelectric output, power is supplemented by diesel generators using John Deere engines for 0-500kW range and Caterpillar engines for the 250kW-2000kW range. the cost of diesel-based generation can vary significantly from year to year, subject to a wide range of market volatility and geopolitical factors and influences. Energy costs and consumer energy bills reflect these factors. Diesel-based generation necessitates storage, transport, and transfer of very large amounts of fuel. Safe, reliable fuel storage facilities represent an additional cost. The transport, transfer, and storage of fuel also carries an ever-present risk of fuel spills due to human error. Fuel-related costs are passed through to APC's customers via COPA charges.

Power to the Chilkat Valley is, on average, 10% Diesel generated. The cost of diesel represents a large cost to APC.

In the case of small, micro-grid utility systems, development of intermittent renewables via DG projects does not allow the utility to retire diesel plant capacity, as this capacity is still required to meet electrical needs when intermittent renewables are not available (Custer, 6).

$4,909,914 COS (Cost of Sale) of diesel in 2022 by APC. (7, Tomczyk)

According to the U.S. Energy Information Administration, the average retail price of diesel in Alaska was $4.56 per gallon in September 2023, which is $1.94 higher than the national average of $2.62 per gallon. The diesel price in Alaska has increased by $1.88 per gallon since September 2020, when it was $2.68 per gallon. The highest diesel price in Alaska in the last 3 years was $5.12 per gallon in April 2022, and the lowest was $2.31 per gallon in December 2015 (7, EIA).

There is a higher cost of transporting and distributing fuel in Alaska, which effects the prices of power generation in the Chilkat Valley.

APC generally uses John Deere engines for 0-500kW range and Caterpillar engines for the 250kW-2000kW range.

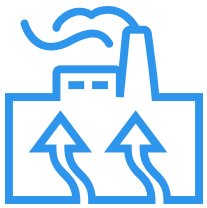
$5.12
Highest Diesel Price in Alaska
September 2020

$2.31
Lowest Diesel Price in Alaska
December 2015

What is Rate Decoupling, and how can it help prices in the Chilkat Valley?

Rate decoupling is a regulatory tool that separates a utility's revenues from its sales of energy, such as diesel. This means that the utility does not earn more money by selling more energy, or lose money by selling less energy. Instead, the utility's revenue is based on a target amount that is approved by the regulator, and the rates are adjusted periodically to match the actual sales with the target revenue. The purpose of rate decoupling is to remove the incentive for utilities to increase their sales of energy, which may conflict with the goals of energy efficiency and conservation. By decoupling revenues from sales, utilities can support programs that help customers reduce their energy consumption, without harming their own financial interests (8, Energy.gov).

Currently, APC does not have the ability to use a rate decoupling mechanism to reduce the risks associated with increasing instances of EE/DG. In the current utility environment in which APC operates, decoupling energy charges from per kilowatt hour sales would remedy a variety of unique challenges and inequities which the utility and its ratepayers face. Decoupling better aligns APC's interests with that of its customers, creating a utility environment where DG and EE are no longer at financial odds with APC's sales volumes. The decoupling mechanisms APC proposed in a prior rate case could better attribute costs (9, Custer).



10% of power in the Chilkat Valley is diesel generated.

Rural Community Considerations

Supplying power to rural communities comes at an increased cost and risk of business for utility companies, with the cost being passed on to the consumer. Power to rural Alaskan communities is supplied via separated micro-grids and do not produce the economies of scale needed to operate efficiently and at times require significant investment in infrastructure. Rural communities also have large demographic volatility, low population growth, boom and bust cycles, and fragile resource-based economies. Extreme climate lends itself to supply chain issues, higher transportation and logistical costs, and labor cost or shortages.

Alaska is a seasonal economy, with Skagway following suit. Populations in APC service areas tend to fluctuate widely due to seasonal nature of fishing and tourism industries, and the reliance on diesel-based generation greatly increase prices to its consumers.

Fluctuating prices have resulted in hampered economic progress in some regions, and especially in rural areas such as the remote villages of Alaska. The COVID-19 pandemic resulted in lower sales than in previous years.

Upper Lynn Canal's service area experienced considerable economic distress during the COVID-19 pandemic due to the cessation of cruise ship tourism traffic, which has slowly recovered through 2021 and 2022. Total generated energy in the region dipped during this period, decreasing 13.5% from 2019 to 2020, and gradually recovering until as of 2022 the usage has recovered to within 1% of 2019 consumption (10, Custer).

67,048 Mwh
sold in 2019

64,408 Mwh
sold in 2020

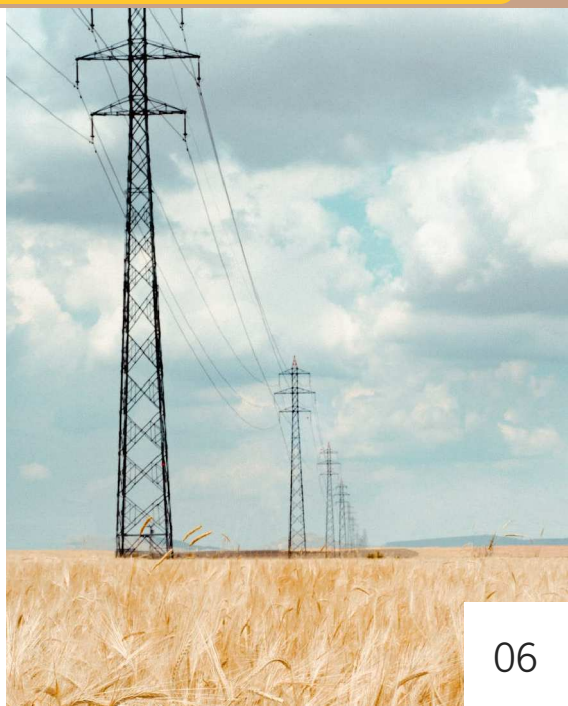
69,769 Mwh
sold in 2021

73,692 Mwh
sold in 2022

Residential per household energy

The average home in the Haines Borough is 1,751 square feet and uses 237 million BTUs of energy annually, compared to the statewide average of 227 million BTUs per year. Using AKWarm estimates, the average annual energy cost for homes in the Haines Borough is $5,739. This is approximately 1.4 times the statewide average and 2.5 times the national average. Efficiency of households:

Drafty Homes and Ventilation: Approximately 553 (54 percent) of occupied homes in the Haines Borough are drafty, exceeding seven air changes per hour at 50 Pascals (ACH50). The statewide average is 36 percent. In contrast, there are an estimated 543 occupied housing units (53 percent) in the Haines Borough that are relatively airtight and lack a continuous ventilation system. These homes are at higher risk of issues with moisture and indoor air quality.
(11, Alaska Housing Finance Corporation, Haines Housing Analysis 2017).



Alaska's Energy Profile

The oil and natural gas industries are a key part of Alaska's energy-intensive economy, and the state ranks third in the nation with the highest amount of energy consumption per dollar of GDP.
Alaska has other substantial energy resources. Its recoverable coal reserves rank 13th among the states.13 Alaska's many rivers offer some of the best hydroelectric power potential in the nation.14 Large swaths of the Alaskan coastline have significant wind energy resources, and the state's many volcanic areas offer geothermal energy potential.15,16 Alaska's total energy demand is among the lowest one-fourth of the states. (12, US Energy Information administration)

2nd

With its harsh winters, energy-intensive oil and natural gas industries, and small population, the state's per capita total energy consumption is the second-highest in the nation, after Louisiana.

33%

Total renewable energy accounted for about 33% of Alaska's total electricity generation in 2022.

Power Cost Equalization (PCE)

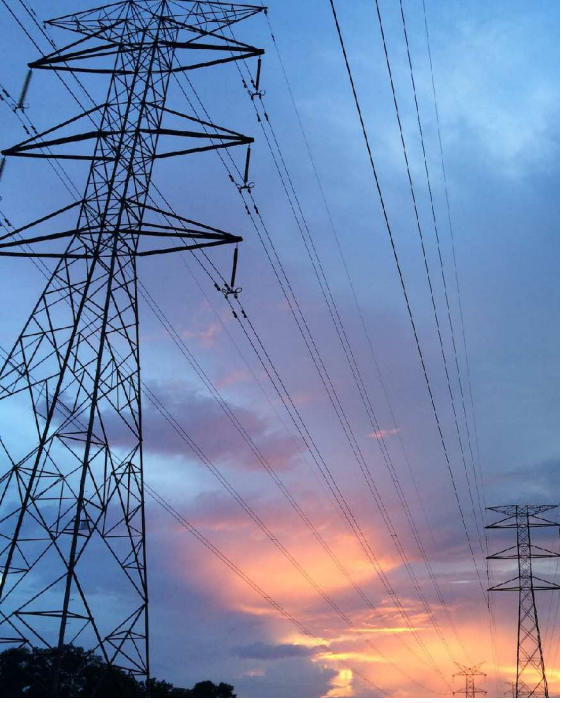
The Power Cost Equalization program ("PCE") provides economic assistance to communities and residents of rural electric utilities, essentially buying down the cost of
energy to rates similar to those in urban communities. APC's residential customers all rely upon the PCE program to help reduce the cost they must pay for the first 750 kWh of power
consumed each month.

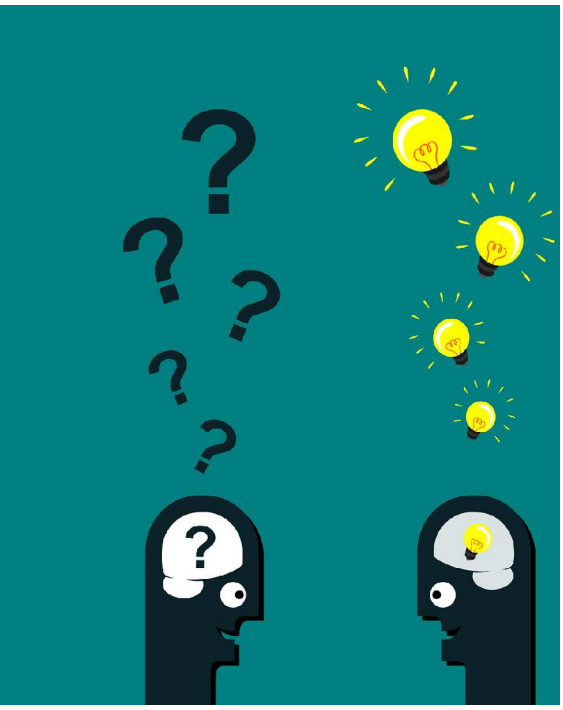
Benefits of PCE to the Chilkat Valley:
The PCE program also supported community facilities in Haines, such as schools, health clinics, and public safety buildings. The PCE program reduced the community facility rate by 13.5 cents per kilowatt-hour, resulting in an average monthly savings of $1,441 per facility.
In total, the PCE program provided $1.6 million in subsidies to Haines in 2021, benefiting 3,390 residents and 25 community facilities (13, AK Energy Authority).

14.9 Million kilowatt-hours consumed in Haines in 2021.

$38 Monthly savings to households from PCE.

$1,441 Monthly savings to facilities from PCE.





Improvement of Energy Efficiency (EE)

As a small rural community, The Chilkat Valley can increase their energy efficiency by implementing a variety of measures that can reduce their energy consumption, lower energy costs, and improve quality of life. Some of the possible measures are:

Efficient Lighting Design:

Use natural lighting whenever possible and design spaces to maximize daylight.
Install motion sensors and timers for lighting in less frequently used areas.

Building Insulation and Sealing:

Properly insulate walls, roofs, and floors to reduce heat loss in buildings.
Seal gaps and cracks in windows, doors, and walls to prevent drafts and heat transfer.

Energy-Efficient Transportation:

Opt for fuel-efficient vehicles or electric cars.
Use public transportation, carpooling, biking, or walking whenever possible.

Energy Audits and Monitoring:

Conduct regular energy audits to identify areas of improvement and prioritize energy-saving measures.
Use energy monitoring systems to track energy consumption and identify anomalies.

Develop biofuel infrastructure:

Can help rural communities produce and use renewable fuels from local biomass resources, such as agricultural waste, wood chips, or algae.

By adopting a combination of these strategies, individuals, businesses, and communities can significantly reduce energy consumption and contribute to a more sustainable and environmentally friendly future. However, if energy efficiency efforts reduce sales to APC, this can result in increased electricity prices.

Increased Energy Prices

In September 2023, APC filed a request to increase its energy rates by 25%, citing rising fuel costs and declining revenues due to COVID-19 pandemic. The proposed rate hike would affect all IPEC customers, including those in the Chilkat Valley. The Revenue Requirement Study and APC's prefiled testimony demonstrate a revenue requirement deficiency of $3,655,594. Eliminating this deficiency would require a 24.68% increase in total revenue. The request is pending approval by the Regulatory Commission of Alaska, which is expected to make a decision by the end of the year. A 15% interim increase was approved, to begin on October 1st, 2023. This increase was opposed by the local communities, which already have a high-cost burden for electricity. If approved, the new rates would take effect in January 2024.

The current average monthly residential rate for IPEC customers is 23.7 cents per kilowatt-hour, which is already higher than the national average of 13.6 cents per kilowatt-hour. The proposed rate increase by APC would raise the average monthly residential rate for IPEC customers to 29.6 cents per kilowatt-hour, which is more than double the national average.

Proposed New Energy Rates

Tariff Sheet	Rate Schedule	Service	Rate Group	Current Rate	Percentage Change	Adjusted Rate	Dollar Change
103.1	Security Light Service	Using Existing Poles - per month	ALL	$ 5.46	24.68%	$ 6.81	$ 1.35
103.1		Using an Additional Pole - per month	ALL	9.88	24.68%	$ 12.32	2.44
101	Special Services	Connection Fee - Single Phase	ALL	$ 50.00	24.68%	$ 62.34	$ 12.34
101		Connection Fee - Three Phase	ALL	125.00	24.68%	$ 155.85	30.85
101		Reconnection Charge - Normal Bus. Hrs.	ALL	50.00	24.68%	$ 62.34	12.34
101		Reconnection Charge - Off Hours	ALL	100.00	24.68%	$ 124.68	24.68
101		Meter Test Fee	ALL	50.00	24.68%	$ 62.34	12.34
101		Authorized Breaking of Meter Seal	ALL	30.00	24.68%	$ 37.40	7.40
101		Unathorized Breaking of Meter Seal	ALL	200.00	24.68%	$ 249.36	49.36
101		Field Charge	ALL	40.00	24.68%	$ 49.87	9.87
101	Service Call-Out - Normal Bus. Hours	per hour per employee	ALL	75.00	24.68%	$ 93.51	18.51
101	Service Call-Out - Off Hours	per hour per employee	ALL	100.00	24.68%	$ 124.68	24.68
102		Dishonored Payment Fee	ALL	25.00	24.68%	$ 31.17	6.17

101	NA	service - Three phase	All	$ 125.00	15.00%	$ 143.75	$ 18.75
101	NA	Reconnection Charge - 8am - 4pm Monday-Friday, excluding Holidays	All	$ 50.00	15.00%	$ 57.50	$ 7.50
101	NA	Reconnection Charge - All other hours and Saturdays, Sundays, and Holidays	All	$ 100.00	15.00%	$ 115.00	$ 15.00
101	NA	Meter Test Fee - subject to refund under Section 9.11	All	$ 50.00	15.00%	$ 57.50	$ 7.50
101	NA	Authorized Breaking of Meter Seal	All	$ 30.00	15.00%	$ 34.50	$ 4.50
101	NA	Unauthorized Breaking of Meter Seal	All	$ 200.00	15.00%	$ 230.00	$ 30.00
101	NA	requiring a special trip by a Company	All	$ 40.00	15.00%	$ 46.00	$ 6.00
101	NA	Service Call-Out and Inspection Fee - during working hours - per hour per employee	All	$ 75.00	15.00%	$ 86.25	$ 11.25
101	NA	After Working Hours, Saturdays, Sundays and Holidays, per hour per employee	All	$ 100.00	15.00%	$ 115.00	$ 15.00
101	NA	After Working Hours, Saturdays, Sundays and Holidays, per hour per employee	All	$ 100.00	15.00%	$ 115.00	$ 15.00
102	NA	Dishonored Payments	All	$ 25.00		$28.75	$ 3.75
103.1	NA	Security Light Service - using existing poles - per month	All	$ 5.46	15.00%	$ 6.28	$ 0.82
103.1	NA	Security Light Service - using an additional pole - per month	All	$ 9.88	15.00%	$ 11.36	$ 1.48
105	A-1 Residential & Small Commercial	Energy Rate - per kWh	1	$ 0.15	15.00%	$ 0.17	$ 0.02

15, Tomczyk

- Ratepayers are protected through refunds if the final revenue requirement is less than the interim revenue requirement – There is little chance that APC's final revenue requirement will be lower than the requested interim revenue requirement, given the difference between the calculated rate deficiency of 24.68% and the requested interim increase of 15%. However, in the event this occurs, APC will make refunds to its affected customers, including interest at the statutory rate of 10.5%, thereby adequately protecting its customers.

New Concept:
APC introduces optional Time of Use (TOU) rates. In simplest terms, TOU rates make electricity more expensive during peak hours and less expensive during hours of low demand. The TOU rates will apply from 7am-7pm.
(14, Tomczyk).

Resources

- Alaska Electric Light and Power Company: Provides information about energy and conservation.
- Renewable Energy Alaska Project: Provides information about energy efficiency, renewable energy projects and programs in Alaska, and identifies opportunities for action.
- Alaska Energy Authority: Renewable energy resource maps, reports, programs, planning, and financing information. Oversees the Alaska Renewable Energy Grant Fund.
- Alaska Energy Network: A public networking site for people interested in Alaska's energy matters to share information and connect with others, and to ask experts energy-related questions.
- Alaska Center for Energy and Power (ACEP): University of Alaska research center for applied research to lower energy costs and develop economic opportunities throughout Alaska.
- Alaska Wood Energy Development Task Group (AWEDTG): is a coalition of federal and state agencies and not-for-profit organizations that explore opportunities to increase the utilization of wood for energy and biofuels production in Alaska.
- ACEP publication database: ACEP searchable database of energy research, including papers, presentations and reports.
- Alaska Energy Wiki: Hosted by ACEP, the site provides information on energy technologies, energy opportunities, and energy projects in Alaska.
- Alaska Energy Efficiency Partnership: Provides useful information for homeowners, building owners, professionals and students about ways to be more energy efficient.
- Cold Climate Housing Research Center (CCHRC): Research and development of cold-climate building techniques and technologies, including energy efficiency and micro-generation renewable energy technology.
- Alaska Energy Authority (AEA) Commercial Building Energy Audit Program: Offers financial incentives and technical assistance to businesses for conducting energy audits to identify efficiency improvements.
- USDA Rural Energy for America Program (REAP): Provides grants and loans to rural businesses for energy efficiency improvements, renewable energy projects, and energy-efficient equipment upgrades.
- Alaska Industrial Development and Export Authority (AIDEA) Energy Efficiency Revolving Loan Fund: Offers low-interest loans to businesses for energy efficiency upgrades and renewable energy projects.
- Alaska Energy Efficiency Revolving Loan Fund: Provides loans to Alaska-based businesses for energy efficiency improvements in areas such as lighting, heating, and cooling systems.
- Alaska State Small Business Energy Efficiency Grant Program: Offers grants to small businesses for implementing energy efficiency measures that lead to operational cost savings.
- Alaska Department of Commerce, Community, and Economic Development (DCCED) Commercial Building Energy Audit and Retrofit Program: Provides funding to businesses for energy audits and subsequent retrofit projects.

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