

IV. Economic Context

Alaska's Population

Population at a Glance

- Alaska's total population increased steadily in the first half of the 2010-2020 decade, but saw decline in the latter half to roughly 734,000 in 2021.⁶
- Since 2012, more people have moved out of Alaska than have moved into the state every year. Between 2020 and 2021, the state saw net outmigration of 3,300 people.
- The number of prime working-age Alaskans fell by over 22,000 between 2010 and 2022, due to aging and outmigration.
- About a quarter (25%) of Alaskans over 25 years old have some college education but no degree.
- The majority (66%) of Alaskans identified as "White" in the 2020 Census. The second largest racial group in the state identify as "Alaska Native or American Indian" (19%).

Alaska has one of the lowest state populations in the U.S, with 734,323 people in 2021 according to estimates generated by the DOLWD.⁷ Overall, over the last decade the state's total population has increased slightly. However, looking at the annual change tells a different story. From 2010 to 2016, the population rose steadily, growing 0.75% annually on average. After 2016, population began to decline, coinciding with the statewide recession lasting until 2018, when employment began to pick up, and likely would have been followed by a slow rise in population had it not been for the COVID-19 pandemic. From 2020 to 2021, population grew slightly due to natural increase (births over deaths) and a decrease in outmigration.

Statewide Population

Number of people living in Alaska, 2010 to 2021.

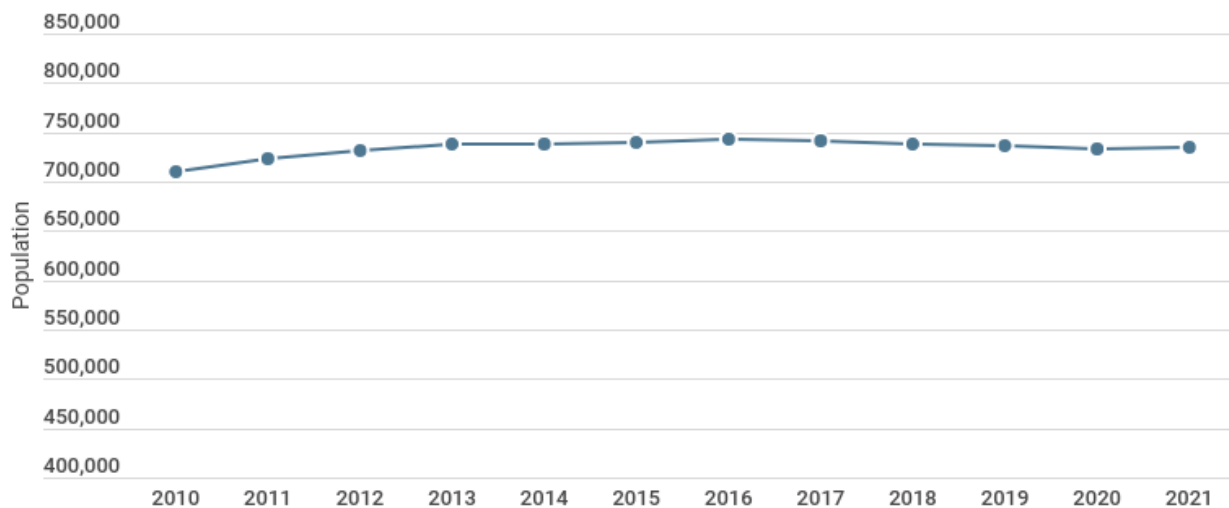


Figure 5: Statewide population, 2010 to 2021.

Source: DOLWD.

The populations of specific boroughs and census areas across the state have followed their own trends over the last decade. The Municipality of Anchorage is by far Alaska's most populated region, with just

under 300,000 people, and accounts for nearly 40% of the state’s total population. Between 2011 and 2021, the total number of Anchorage residents has fallen by about 2.1%. In the Mat-Su borough, the second largest in the state, the number of residents increased over 18% since 2011.

Population by Region, 2011 and 2021

Region	Population 2011	Population 2021	Percent Change
Skagway	974	1,203	23.5%
Mat-Su	91,620	108,805	18.8%
Aleutians East	3,152	3,583	13.7%
North Slope	9,674	10,995	13.7%
Hoonah-Angoon	2,184	2,350	7.6%
Yakutat	650	697	7.2%
Kusilvak	7,710	8,139	5.6%
Bethel	17,539	18,416	5.0%
Kenai Peninsula	56,491	58,957	4.4%
Chugach Census Area	6,839	7,009	2.5%
Petersburg	3,303	3,368	2.0%
Ketchikan	13,760	13,895	1.0%
Haines	2,614	2,614	0.0%
Nome	9,747	9,691	-0.6%
Fairbanks North Star	98,178	97,515	-0.7%
Juneau	32,411	32,155	-0.8%
Northwest Arctic	7,691	7,575	-1.5%
Anchorage	296,058	289,697	-2.1%
Southeast Fairbanks	7,058	6,881	-2.5%
Dillingham	4,945	4,718	-4.6%
Aleutians West	5,431	5,169	-4.8%
Sitka	8,992	8,387	-6.7%
Kodiak Island	13,887	12,900	-7.1%
Yukon-Koyukuk	5,686	5,255	-7.6%
Denali	1,813	1,655	-8.7%
Prince of Wales-Hyder	6,421	5,729	-10.8%
Wrangell	2,376	2,096	-11.8%
Copper River	3,018	2,626	-13.0%
Lake and Peninsula	1,669	1,421	-14.9%
Bristol Bay	1,018	822	-19.3%
Total	722,909	734,323	1.6%

Table 10: Population by Region, 2011 and 2021.

Source: DOLWD.

DOLWD estimates the state’s population up to the year 2045, based on past trends and other analysis. Population growth is always uncertain, as it is subject to a variety of economic factors and other events, so DOLWD models a low, middle, and high population estimate to indicate a range of possibilities, from conservative to optimistic. In a conservative scenario the population will decrease slightly, while the

middle and optimistic scenarios project growth between 10% and 50% by 2045. Growth would depend on the reversal of the recent outmigration trend.

Population Projection

Statewide population projections, 2010 to 2045.

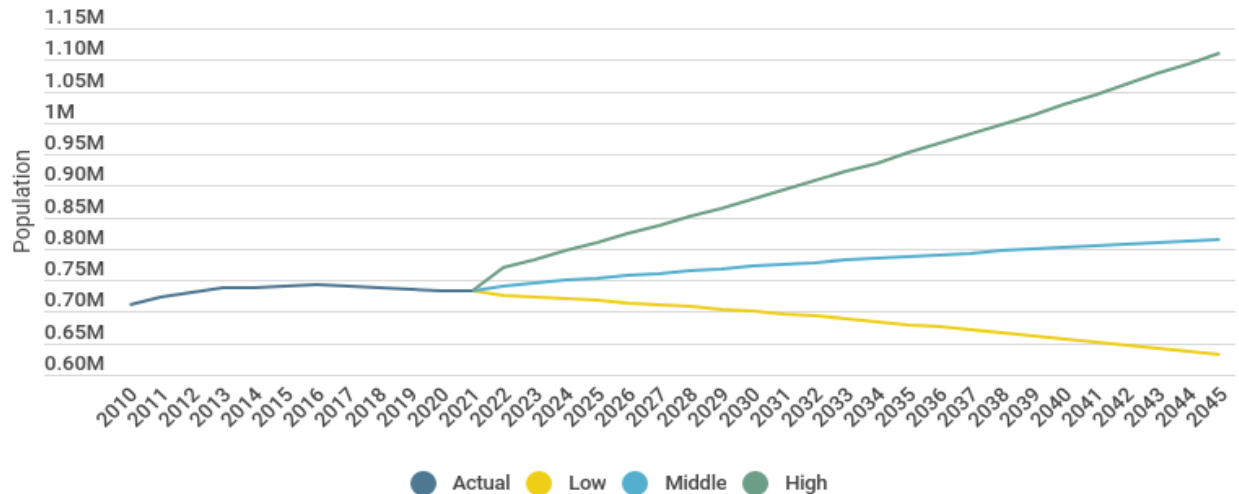


Figure 6: Statewide population projections to 2045.

Source: DOLWD.

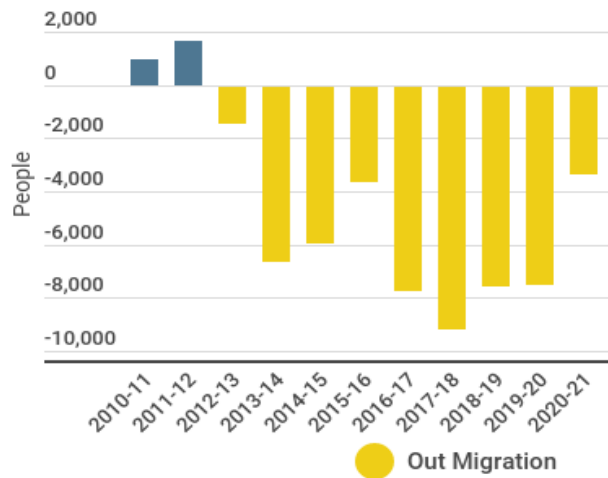
Migration

Population experiences a dynamic flow that is a function of birth and deaths, but also migration into and out of any given geography. When examining population dynamics, birth and death rates tend to remain constant; therefore, migration is a key metric for measuring community and economic health.

The net outmigration reached a peak in 2017 to 2018, coinciding with the state's economic recession and accompanying job losses. However, there is a common misperception that people are leaving Alaska in droves while no one moves into the state, which is not the case. Over 30,000 people have moved to Alaska every year since at least 2010 (roughly 4 to 5% of the total population); however, they are outnumbered by the people moving away.

Flow of Population To and From Alaska

Net migration in Alaska, 2010 to 2021.



Total In/Out Migration in Alaska, 2010 to 2021.

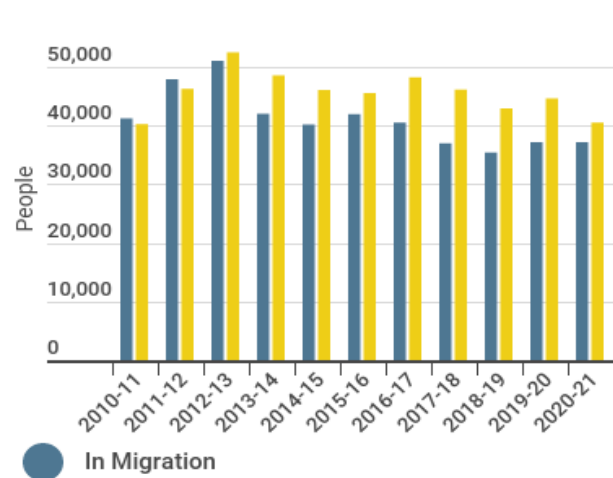


Figure 7: Net migration in Alaska, 2010 to 2021.
Source: DOLWD.

Population by Sex and Age Group

Historically, men outnumber women in Alaska, a trend driven at least partly by the industries present in the state. That gap has decreased over time. In 2021, an estimated 51% of the state’s population were male and 49% are female, according to DOLWD.

Age dynamics in the state are an important metric of Alaska’s workforce. The largest age group for both men and women is 30 to 39, after which there is a significant drop off. This may be due to large employment concentrations in construction, oil and gas, and mining, which generally employ younger people and more men than women. The median age in Alaska 33.8 years, which is about 5 years lower than the median age nationwide.

Alaska’s population as a whole is aging. From 2010 to 2021, the number of working age Alaskans (those aged 20 to 60 years) decreased by 5.3% while the number of Alaskans of retirement age, or 65+, increased by 82.3%.⁸ While pandemic factors contributed to some people’s decision regarding retirement, this has been an ongoing challenge in Alaska long before the outbreak of COVID-19. Alaskans are reaching retirement age without enough younger people to replace them in the workforce, contributing to today’s hiring strains and staff shortages.



Figure 8: Net Change in Age Groups, 2010 to 2021.
Source: DOLWD

Alaska's Demographics on Age and Gender

Population by age and gender, 2021.

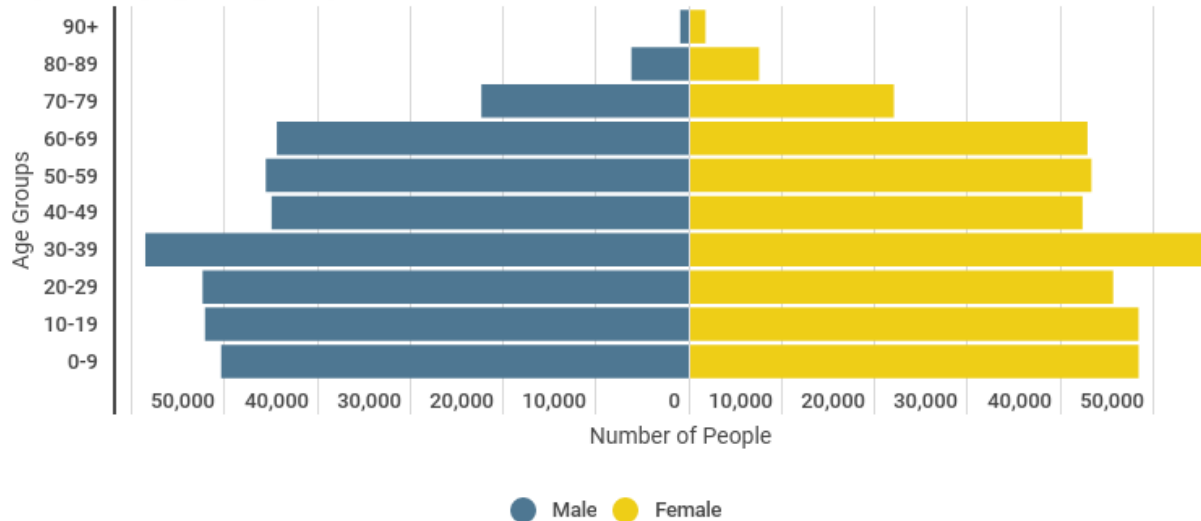


Figure 9: Population by age and gender, 2021.
Source: DOLWD.

Race and Ethnicity

Alaska has an increasingly diverse population. After Alaskans identifying as “White” (66%), “Alaska Native or American Indian” (19%) were the second largest racial group in the state identified on the 2020 Decennial Census. Asian is the third largest racial group identified in the state, representing 8% of Alaskans. Between 2010 and 2020, the percentage of Alaskans identifying as a race other than white (alone or in combination)⁹ grew while Alaskans identifying as “White” decreased: “Alaska Native or American Indian” grew by 6%, “Black or African American” by 15%, and “Asian” by 27%.¹⁰

Alaska's Race and Ethnicity

Population by self-identified race, 2020.

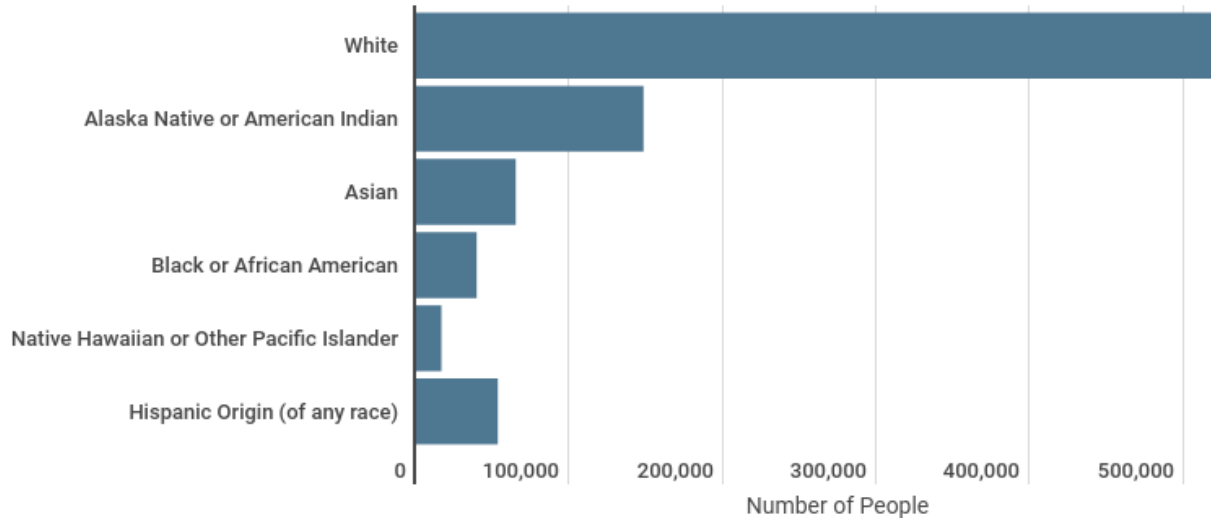


Figure 10: Population by self-identified race, 2020.
Source: DOLWD.

Education

Educational attainment is an important consideration in evaluating the capacity of the workforce. Statewide, 93% of adults aged 25 and over have a high school diploma or equivalent, which is higher than the national average. However, just 30% hold a Bachelor's degree or higher, which is lower than the national average.

Educational Attainment of Alaskans

Highest level of education completed, Alaskans aged 25 or older.

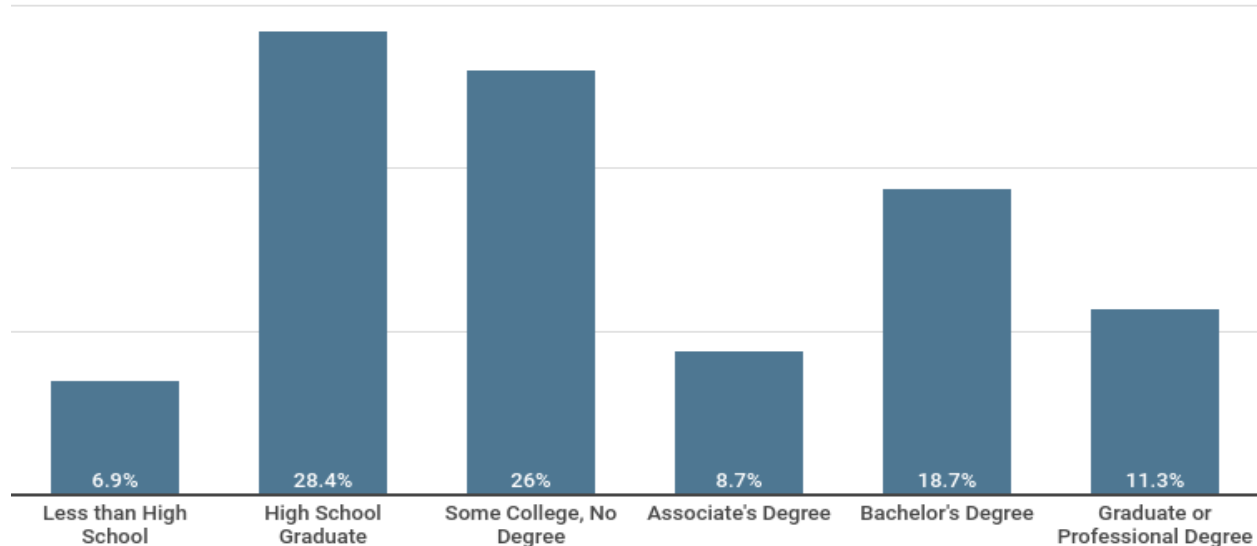


Figure 11: Highest level of education completed, Alaskans aged 25 or older.

Source: U.S. Census Bureau American Community Survey (ACS) 5-Year Estimates, 2020.

Cost of Living

When assessing economic conditions in any region it is important to consider indicators of quality of life. A prosperous population can be a strong indicator of economic health. In addition, favorable quality of life indicators like low cost of living and access to services and amenities are important for attracting and retaining a qualified workforce.

Alaska has historically struggled with high costs of living across the state. Energy, health care, housing, retail goods, services, and more are typically more expensive than in the Lower 48, and sometimes unavailable at all. This impacts both firms and households who must spend more on basic necessities than their counterparts in the rest of the country. These challenges are especially prevalent in the state's rural communities, where costs can be crippling for households and make many forms of commercial activity infeasible.

These variables are balanced, however, by other quality of life indicators, some of which can be difficult to measure. Alaska is well known for its access to outdoor recreation opportunities and natural beauty. These are amenities that attract visitors to the state, but also improve quality of life for residents.

Living Costs Compared

The Council for Community and Economic Research (C2ER) is the most widely cited source for comparing the cost of living in different cities in the U.S. via its Cost of Living Index (COLI). The COLI includes extensive price data from about 300 U.S. cities, and estimates cost indices for each city and state. The index factors in groceries, housing, utilities, transportation, health care, and miscellaneous goods. In 2021, Alaska ranked as the fifth most expensive state in the country, behind the District of Columbia, Hawaii, California, and Massachusetts, with overall living costs about 30% above the national average.¹¹

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State cost of living index comparison, 2021

State	Percent Above U.S. Average
District of Columbia	60%
Hawaii	50%
California	35%
Massachusetts	32%
Alaska	31%
Rhode Island	29%

Table 11: State cost of living index comparison, 2021.

Source: C2ER.

More detailed COLI data is available for the four Alaska cities that participate in the index: Anchorage, Fairbanks, Juneau, and Kodiak. All four communities rank among the 25 most expensive cities in the U.S. for overall living costs. Unfortunately, the COLI does not include data for other cities in the state.

Living costs, percent above national average in 2022

City	Groceries	Housing	Utilities	Transportation	Health Care	Misc. Goods	Overall
Juneau	41%	43%	37%	15%	53%	7%	30%
Anchorage	26%	39%	27%	12%	49%	18%	28%
Kodiak	48%	23%	30%	0%	56%	21%	27%
Fairbanks	23%	8%	118%	14%	55%	16%	27%

Table 12: Living costs, percent above national average in 2022.

Source: C2ER.

Note: Includes only the four Alaska cities participating in the Cost of Living Index. Average of Q1 2021 through Q1 2022

Housing

Housing costs and availability are two of the most important factors in the cost of living. Housing costs across Alaska are variable, but high almost everywhere compared to the rest of the U.S.

As with most of the U.S., average home sales prices increased sharply in 2020 and 2021, with low interest rates and pandemic factors driving high demand. Statewide, the average sales price for a single-family home in 2021 was \$388,648, about 8% higher than 2020.¹² Sales prices vary across the state according to local housing market conditions—from \$313,802 in the Fairbanks North Star Borough to \$439,961 in the Ketchikan Gateway Borough.

In 2021, median statewide rent cost was \$1,179/month. At \$950 per month, the Wrangell-Petersburg area had the lowest rent, with the highest being Sitka at \$1,323 per month. Statewide, the rental vacancy rate fell from 9.2% in 2020 to 5.9% in 2021.¹³

New Housing Units Built and Average Home Cost in Alaska

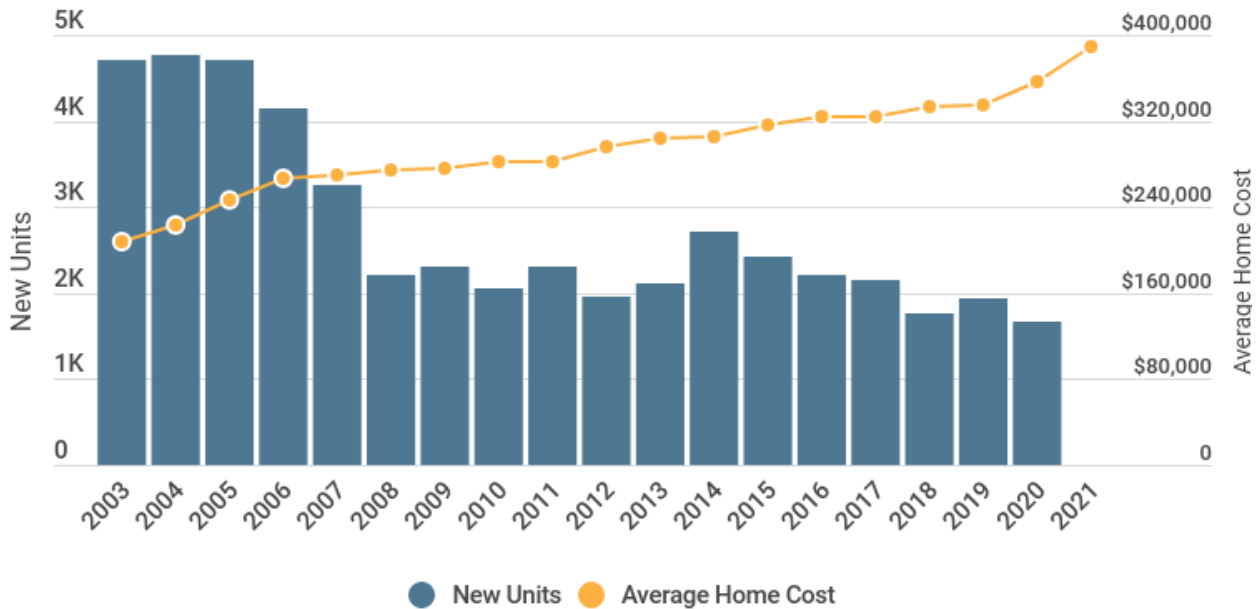


Figure 12: New housing units in Alaska compared to average home cost, 2003-2021.

Source: DOLWD and AHFC.

Both rental and owner-occupied housing appear to suffer from limited building activity. Over the last two decades, new housing construction fell from a high of nearly 4,800 units statewide, to only 1,669 in 2021.

Health Care

Health care costs are a heavy burden on households and employers alike. Alaska’s health care system is challenging in terms of both cost and availability. Across Alaska, residents struggle with accessing both basic health services in rural/remote areas and specialty services in more urban areas. Alaska’s health care costs are the highest in the nation by any number of measures. The COLI data ranks Anchorage, Fairbanks, Juneau, and Kodiak as the four most expensive cities in the country for health care. Annual average health insurance premiums totaled \$8,635 in 2020, the most of any state.¹⁴

Most expensive health care premiums by state, 2020

State	Average Annual Total Premium
Alaska	\$8,635
New York	\$8,177
New Hampshire	\$7,991
Vermont	\$7,868
Wyoming	\$7,743
U.S. Average	\$7,149

Table 13: Most expensive health care premiums by state, 2020.

Source: Kaiser Family Foundation.

Employers in government, nonprofits, and businesses alike struggle with the high cost of providing health insurance for employees.

Energy

Energy costs are high in Alaska compared to national averages and can be a constraint for households, industry, and businesses. Access to affordable heat and power can especially be a challenge in less urban areas.

Cost of power ranges widely according to community location and conditions. Urban Alaska experiences some of the lowest electricity costs—ranging from \$0.22/kWh in the Chugach Electric Association service area, to \$0.28/kWh in the Golden Valley Electric Association service area in 2020.¹⁵

In rural Alaska, costs are typically lowest in hub communities, driven by easier access to fuel delivery infrastructure and larger economies of scale. For example, in Kotzebue the average cost of power for residential customers is \$0.41/kWh. In smaller communities, cost of power tends to be higher. In Kobuk, which is in the same region as Kotzebue, the cost of power for residential customers is \$0.81/kWh.¹⁶

It is important to note the value of the Power Cost Equalization program subsidies for rural communities. In the cases of Kotzebue and Kobuk, the examples used above, the PCE subsidy lowers the effective cost of power for residential customers to \$0.22/kWh and \$0.28/kWh respectively.¹⁷

Rural Alaska

Most consumable items in rural Alaska are prohibitively expensive—if they are available at all. Unfortunately, few data sources systematically track costs for rural Alaska. Reports of \$12 for a gallon of

milk and \$6 for a loaf of bread are not uncommon. One report from 2018, the Indian Country Food Price Index, recorded the cost of grocery items in select parts of rural Alaska, and reported a high cost divergence from national averages. In many cases, common food items were two to three times more expensive than national averages.

High everyday costs in Rural Alaska

Prices for select items in Rural Alaska compared to the National Average.

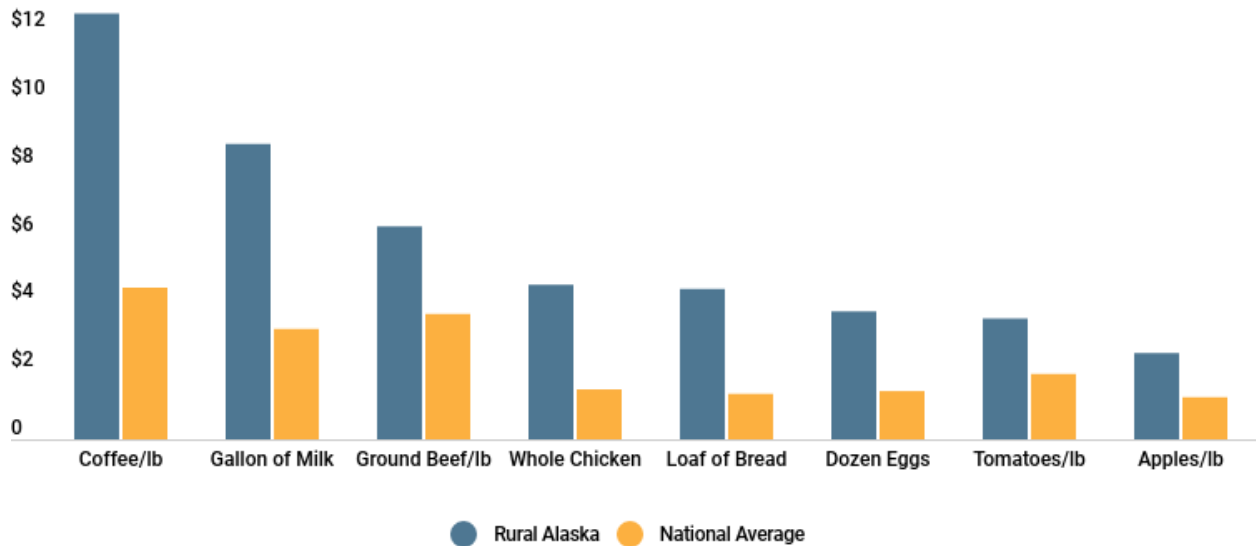


Figure 13: Prices for select items in Rural Alaska compared to the National Average, 2018. Source: Indian Country Food Price Index.

Infrastructure

Alaska is the most sparsely populated state in the U.S., with communities spread across vast distances often not connected by roads and highways. While population density varies across the state, on average there are 1.2 people for every square mile. The majority of the population lives on the state's limited road system, which provides more immediate access to critical infrastructure and lowers the cost of living and the cost of doing business. However, for the hundreds of communities across the state outside the road system, airports and waterways provide access to natural resources, economic assets, and goods and services.

This vastness creates unique infrastructure challenges for the state. Maintenance and upkeep of existing infrastructure can be costly and time intensive. In addition, installation and construction of new infrastructure face the mountainous hurdles of costs, logistics, and distance.

Much of Alaska's infrastructure has historically been supported through the State of Alaska's capital budget, decided on by the legislature and approved by the governor. The capital budget appropriates funds for one-time expenditures such as roads, schools, port construction, and public works infrastructure. This budget fluctuates with the amount of revenue the state receives. In recent years, fiscal constraints have significantly reduced the capital budget—and its funding for infrastructure projects and maintenance.

As oil revenues increased in 2021-2022 and federal infrastructure dollars move to Alaska from the 2021 Infrastructure Investment and Jobs Act (IIJA), forecasts for funding for infrastructure projects in the state are improving. In addition, increased investment and interest in the Arctic are creating opportunities for northern communities to improve infrastructure.

Transportation

Transportation infrastructure is the platform on which Alaska's economy rests, enabling the movement of goods and people across the state, out of state, and across the world. Alaska's transportation networks consist of railroads, roads and highways, airports, and waterways.

Rail

Assets and Stats:

- The Alaska Railroad has 656 miles of track.
- More than 500,000 passengers served per year (pre-pandemic).
- More than 3.2 million tons of cargo moved (pre-pandemic).¹⁸

New Developments:

- Closure of Seward Coal Loading Facility.¹⁹
- A new cruise ship dock to be completed in Seward by 2025.²⁰
- Alberta to Alaska (A2A) Rail: A proposal to build 1,600 miles of new rail joining the Alaska Railroad to Northern Alberta.²¹

The Alaska Railroad stretches from Seward in the south to Fairbanks in the north. The rail system is a major asset for the tourism industry, moving passengers from major ports of entry into the Interior. Prior to the 2020 COVID-19 pandemic, rail passengers reached a peak of 532,000 in 2018. The COVID-19

pandemic’s impact on the tourism industry caused a 94% decline in ridership over the previous year.²² It is expected that passenger traffic will rebound as the tourism industry recovers from the pandemic.

COVID-19 Impacts Railroad Passenger Traffic

Alaska Railroad passenger counts, 2016 to 2020.

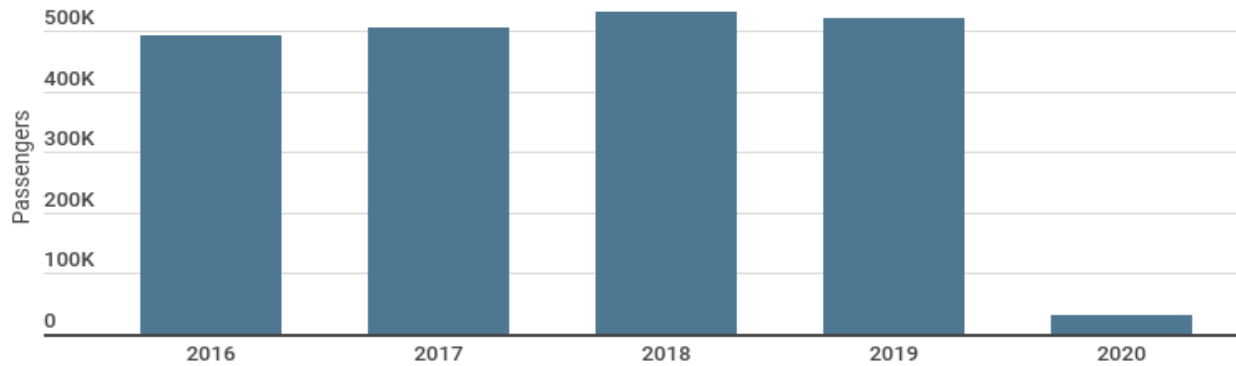


Figure 14: Alaska Railroad passenger counts, 2016 to 2020.
Source: Alaska Railroad Corporation.

The other function of the rail system is to transport freight. Gravel and coal are the two largest commodities transported by rail by bulk tonnage.²³

Railroad as an Artery Moving Bulk Goods Across Alaska

Alaska Railroad freight volumes by year and type of cargo, 2020.

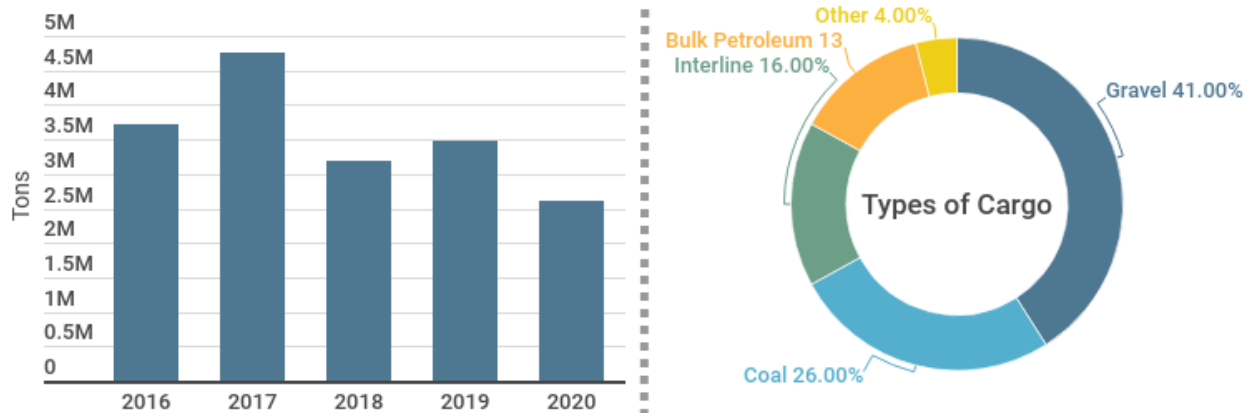


Figure 15: Alaska Railroad freight volumes by year and type of cargo, 2020.
Source: Alaska Railroad Corporation.

Roads and Highways

Assets:

- 12 major highway routes and 1,529 bridges.
- 17,050 miles of public roads with 5,000 miles of paved roads.²⁴

New Developments:

- 210-mile industrial access road under development connecting the Ambler Mining District to the Elliot Highway.²⁵
- Denali National Park road repairs funded by the federal government, including 400 ft bridge over the Pretty Rocks landslide.²⁶
- Installation of 15 electric vehicle fast charging stations across the Alaska road system.²⁷

There is a limited road system in Alaska. The road system connects the population centers in Southcentral Alaska and the Interior, but not the communities in the Northern, Southwest, or Southeast regions (aside from Haines and Skagway in Southeast and the Dalton Highway to oil fields on the North Slope). However, this limited system is able to serve the majority of the Alaskan population. There are 12 major highway routes in Alaska.

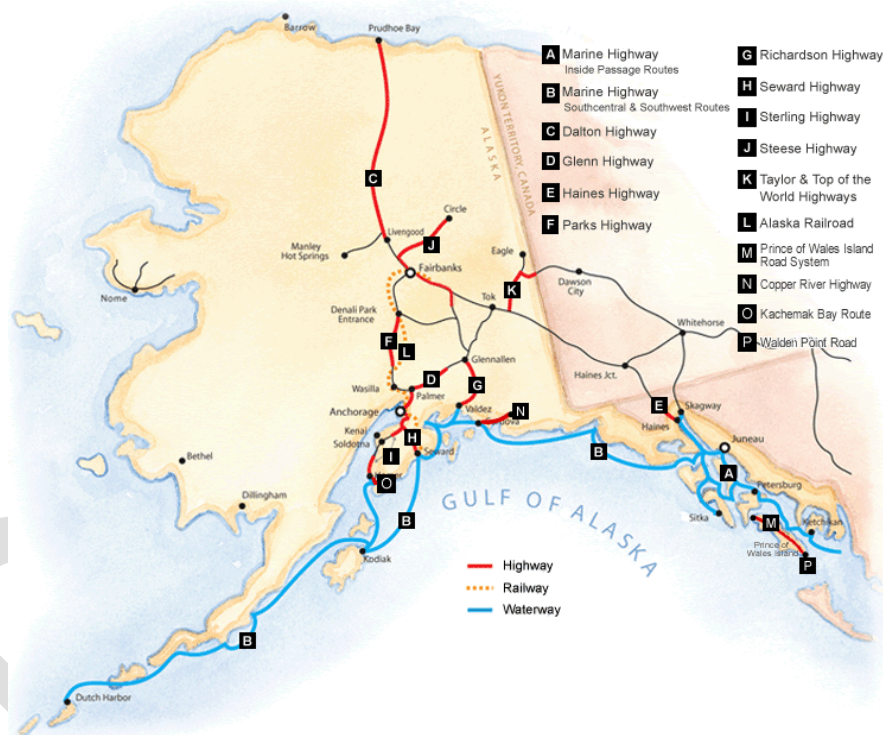


Figure 16: Alaska's roads and highways.
Source: Alaska Public Lands Information Centers.

A handful of notable road projects are under development in the state. The Ambler Access Project is a planned 210-mile industrial access road connecting the Ambler Mining District, located in the Northwest Arctic Borough to the Dalton Highway.²⁸ The project would provide access to mining prospects; however, the project has faced pushback from communities in the region.

As electric vehicles become more popular, the demand for charging stations will increase. The Alaska Energy Authority (AEA) is investing in an electric vehicle fast charging network across the road system. The first round of investment is funding the installation of 15 fast-chargers at nine stations, with plans to expand the network with an additional three locations.²⁹

Airports

Assets:

- 26 major airports.³⁰
- 82% of communities in Alaska depend on the 235 airports in the rural aviation system.
- 2.4 million square miles of airspace.³¹

New Developments

- Ted Stevens Anchorage International Airport ranked the 2nd largest airport in the U.S. in 2020 by landed weight.³²

With hundreds of communities across Alaska lacking access to the road system and vast distances between, isolation drives a high dependence on aviation across rural communities and industrial sites like remote mines and the North Slope. Airports are a critical resource for importing goods and services to Alaska from out-of-state and for moving people and goods around the state.

Intrastate Air Travel Across Alaska

FAA identified airports across Alaska with commercial passenger enplanements, 2021.



* A major airport is a facility that has FAA Part 139 Airport Certification status

Figure 17: FAA identified airports across Alaska with commercial passenger enplanements, 2021.

Source: FAA.

Ted Stevens International Airport is the largest aviation cargo hub in Alaska, serving as an asset for transporting people and goods to Alaska. However, the airport also serves as a logistics hub for the Pacific, with cargo flights from Asia stopping over in Alaska to refuel. The role Alaska plays in the global logistics supply chain has only grown during the COVID-19 pandemic. In 2020, Ted Stevens International Airport was the second largest cargo airport in the U.S. by landed weight. The airport saw 22.9 billion pounds of cargo in 2020, a 25% increase over the previous year.³³

Growth in Cargo Moving through Ted Stevens

Pounds of landed cargo at Ted Stevens International Airport, 2011 to 2020

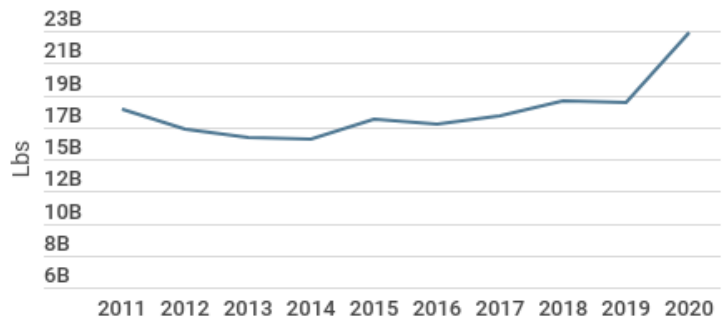


Figure 18: Pounds of landed cargo at Ted Stevens International Airport, 2011 to 2020.

Source: FAA.

Top U.S. cargo airports, 2020

Airport	State	Landed Cargo (lbs)
Memphis International	TN	25.2 B
Ted Stevens International	AK	22.9 B
Louisville Muhammed Ali International	KY	16.8 B
Los Angeles International	CA	13.2 B
Miami International	FL	9.9 B
Cincinnati/Northern Kentucky International	KY	8.2 B
Chicago O'Hare International	IL	7.9 B
Indianapolis International	IN	5.7 B
Ontario International	CA	5.2 B
Dallas-Fort Worth International	TX	4.5 B

Table 14: Top U.S. cargo airports, 2020.

Source: FAA.

Marine Infrastructure

Assets and Stats:

- Alaska has 90 ports total, including 22 with container liner service³⁴ and six deep draft ports.³⁵
- The Port of Alaska (Anchorage) handled 50% of all inbound cargo from all modes of transportation in 2019, serving 90% of the state's population.³⁶
- AMHS serves 33 communities in the state, most of which lack highway access.³⁷

New Developments:

- \$250 million in federal infrastructure funding allocated to the development and construction of an Arctic deep-water port in Nome.³⁸

With thousands of miles of coastline and rivers, and remote communities and resources, maritime activities play an important role in delivering goods to communities and in exporting Alaska's products

to out-of-state and international markets. Many of Alaska’s key economic engines—fisheries, oil and gas, mining, and tourism—are dependent on critical maritime infrastructure.

Alaska's Ports and Harbors

Ports and harbors across Alaska including those with container liner service and deep draft ports.

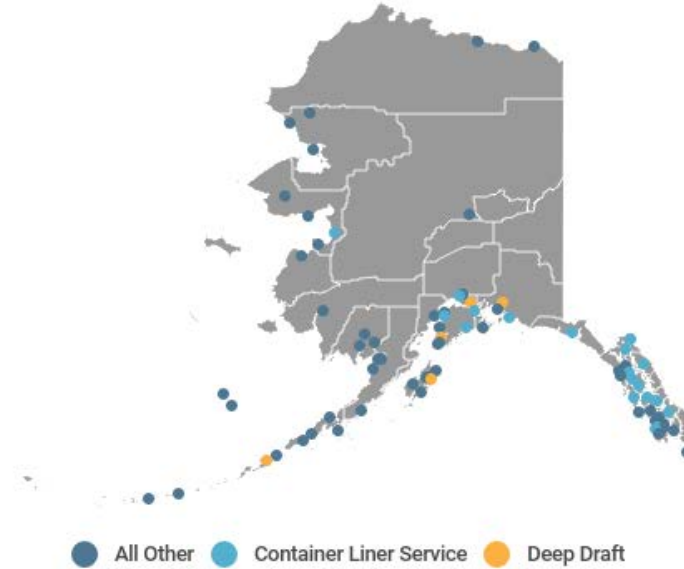


Figure 19: Ports and harbors across Alaska including those with container liner service and deep draft ports. Source: World Port Source and DOT.

Ports and harbors dot Alaska’s coastal landscape. There are 90 designated ports in Alaska, 22 with container liner service.³⁹ However, not every coastal or river-tied community possesses port or harbor infrastructure, such as the ability to receive cargo shipments, roll-on/roll-off capabilities, large boat docks, deep draft port infrastructure (docking facilities with a water depth greater than 35 feet), or access to the state ferry. In many regions of the state, port infrastructure is minimal to non-existent. According to a 2010 survey, there are no communities with roll on/roll off capabilities in the Arctic region.⁴⁰

Percent of communities with port and harbor capabilities in Alaska by region, 2011

Region	Receipt or shipment of cargo by water	Roll on roll off capability	Cruise ship dock	Access to State ferry
Southeast	61%	26%	32%	52%
Prince William Sound	80%	30%	13%	15%
Southcentral	50%	13%	19%	6%
Southwest	60%	12%	12%	28%
Yukon-Kuskokwim	27%	7%	0%	0%
Northwest	20%	7%	7%	0%
Arctic	0%	0%	0%	0%
Interior	*	*	*	*

Table 15: Percent of communities with port and harbor capabilities in Alaska by region, 2011.

Source: Northern Economics.

Note: There appear to be data discrepancies for the Interior region. Therefore, it was not included.

Alaska Marine Highway System

The AMHS is another piece of key marine infrastructure in the state, stretching from Southeast to the Aleutian Islands. The ferry system serves 35 communities—33 of which are in Alaska, one in Washington, and one in Canada. The marine highway has been plagued by budget issues causing reduced sailings and even cancelations in recent years. In 2020, the most recent data year, ridership declined by 73%, largely a result of the pandemic.⁴¹

Alaska Marine Highway System Service Area

Ports of call, 2021.

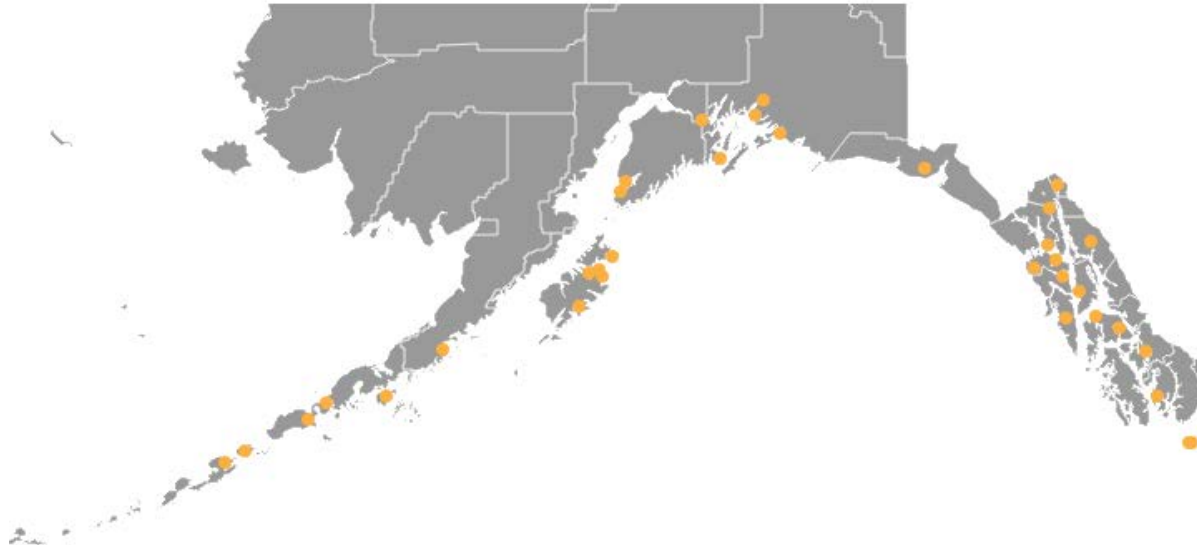


Figure 20: Ports of call, 2021.
Source: AMHS.

The Port of Alaska is another key asset for the Alaska economy. The Port of Alaska, located in Anchorage, ultimately serves 90% of Alaska's population. The port handled 50% of all inbound cargo in the state in 2019 and 75% of all non-petroleum cargo (excluding Southeast). The Port of Alaska supported \$14 billion in commercial activity in 2019.⁴²

New Developments: Port of Nome

Alaska is the U.S.'s gateway to the Arctic; however, the state lacks an Arctic deep-water port. This has come to the forefront of conversations about the Arctic in recent years as economic activity in the Arctic increases. The lack of an Arctic deep-water port represents a missed opportunity to capture some of the economic interest in the Bering Sea and the Arctic in Alaska, but it also represents a security risk for national defense and search and rescue operations in the Bering Sea and Arctic Ocean.

In December 2020, Congress authorized the Arctic Deep Draft Port project in Nome. Federal authorization enabled a two-year-long design phase to be kicked off in Spring 2021, setting out plans for greatly expanding existing port infrastructure in Nome. In January 2022, it was announced that \$250 million from the federal infrastructure bill would be allocated to the Port of Nome.⁴³

Communications and Broadband

Assets and Stats:

- As many as 90% of households in urban Alaska have broadband subscriptions.
- Rural households lag the statewide average, with as few as 43% of households holding broadband subscription in the Yukon-Koyukuk Census Area.⁴⁴

New Developments:

- The IJA includes \$65 billion for broadband infrastructure development nationally, with Alaska getting a minimum of \$100 million in formula funds.⁴⁵
- GCI's TERRA Project began in 2011 and has since connected 84 communities and 45,000 Alaskans to terrestrial broadband infrastructure. GCI continues to expand the network and plans to build out to additional villages in the future.⁴⁶
- Low Earth Orbit satellite internet is beginning to enter the market. While satellite internet is not new in rural areas of Alaska, this new technology proposes providing faster speed internet at lower costs.⁴⁷

Access to fast, affordable internet is increasingly recognized as an integral component of economic activity. Many parts of Alaska lag in access to broadband, specifically in regard to speed and affordability.

Broadband availability ranges widely across regions of Alaska. In more urban areas like Juneau and Anchorage, approximately 90% of households have a broadband subscription. In less densely populated areas of the state like the Nome Census Area, roughly 60 to 80% of households have broadband subscriptions. Households in the Yukon-Koyukuk Census Area in the rural Interior have the fewest number of broadband subscribers at 43%—likely a function of both availability and cost.⁴⁸

Broadband Access in Alaska

Percent of households with broadband subscriptions by region, 2019.

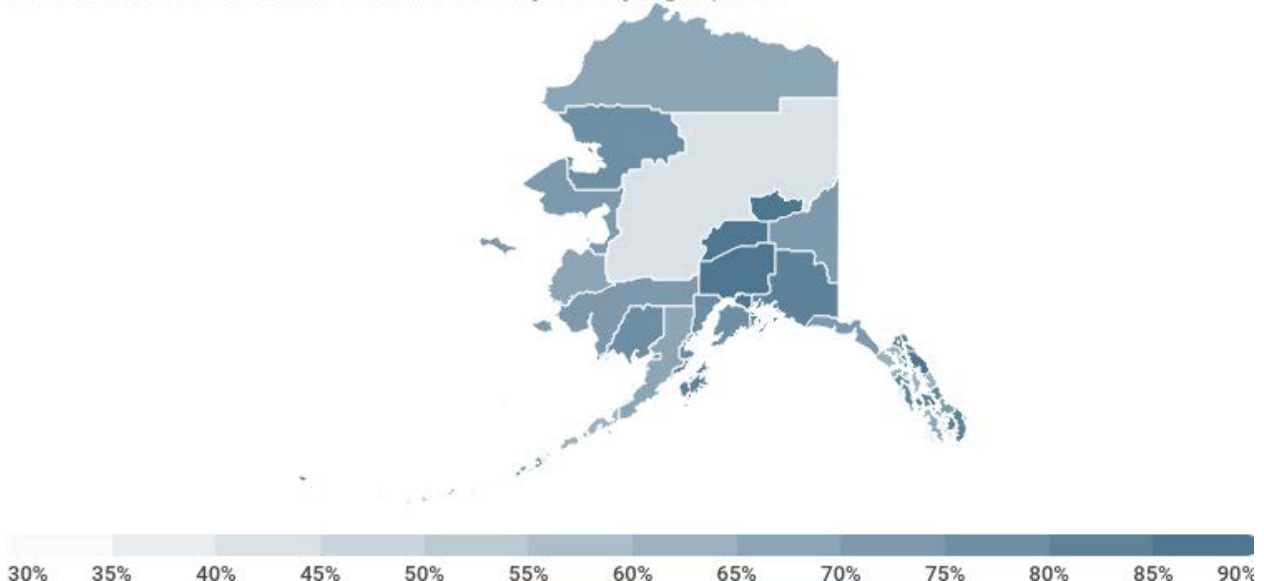


Figure 21: Percent of household with broadband subscriptions by region, 2019.

Source: ACS 2019 5-Year Estimates.

One key challenge for communities and service providers is middle- and last-mile infrastructure, which is the infrastructure connecting the long-haul networks to communities (middle-mile) and individual houses and structures to community networks (last-mile). Increasing access to broadband is critical to enabling economic development across Alaska, with the rise of telework, digital entrepreneurship, and e-commerce.

Federal investment in broadband and communications infrastructure have enabled progress in this area in the last decade, with several projects highlighting progress toward more affordable and available internet access for Alaskans in the future:

Energy

Assets and Stats:

- The largest portion of Alaska energy consumption, 56%, comes from the industrial sector.⁴⁹
- 77% of all energy produced in Alaska is derived from fossil fuels—natural gas, diesel, and coal. The remaining 23% comes from renewable sources including hydroelectric, wind, and solar.⁵⁰
- Cost of power is higher than national averages with the average cost of residential electricity at \$0.23/kWh statewide in 2019.⁵¹ Costs range more widely across the state, from \$0.08/kWh in Nuiqsut to \$1.77/kWh in Lime Village before the PCE subsidy is applied.⁵²

New Developments:

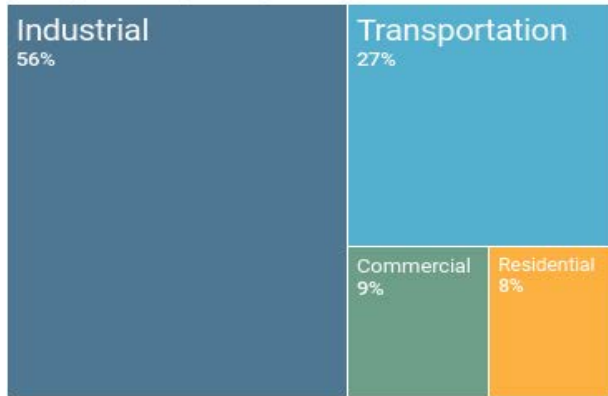
- Governor Mike Dunleavy set a goal of creating renewable portfolio standards for the Railbelt and introducing a sustainable power goal of 80% by 2040.⁵³
- As of 2020, approximately 3.2 MW of solar power generation was installed across Alaska with the ACEP Solar Power Technologies Program.⁵⁴

Just as with other forms of infrastructure in Alaska, energy infrastructure in the state is a complex patchwork heavily influenced by low population density and great distances. The majority – 56% – of Alaska’s energy consumption comes from the industrial sector. Fish processing, mining, and oil and gas extraction make up the building blocks of Alaska’s economy and all are energy intensive. Following industrial consumption, the transportation sector consumes the next largest segment of the state’s energy at 27%.⁵⁵

Alaska has some of the highest energy costs in the nation and is largely dependent on fossil fuels—natural gas, diesel, and coal. Natural gas provides relatively low-emission power and heat, but distribution is limited outside of Southcentral Alaska. A growing percentage of Alaska’s energy production comes from renewable resources—hydroelectric, wind, and solar.⁵⁶

Statewide Energy Consumption and Production

Energy consumption by sector, 2019



Electricity Production by Source in MWh, 2019

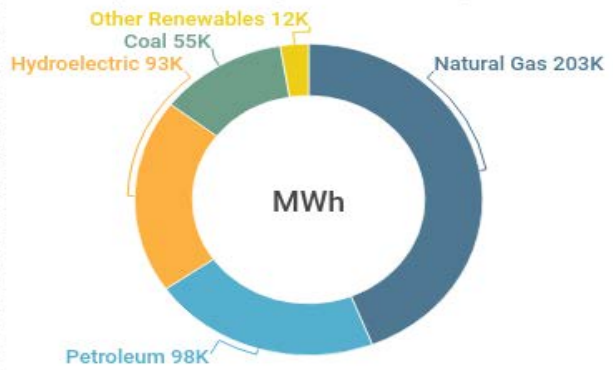


Figure 22: Energy consumption by sector, 2019; Electricity production by source in MWh, 2019. Source: Energy Information Agency (EIA).

It can be helpful to divide Alaska’s energy landscape into two parts: remote and urban. The urban interconnected grid stretching from Homer to Fairbanks along the rail system is colloquially referred to as the Railbelt and is comprised of five independent utilities. The Railbelt system is primarily powered by natural gas generation, followed by coal, hydro, diesel, wind, and solar. The five utilities that serve Railbelt customers are Chugach Electric Association, Matanuska Electric Association, Golden Valley Electric Association, Homer Electric Association, and City of Seward.

Other utilities, like Copper Valley Electric Association and Alaska Power and Telephone, serve customers on the road system. However, these power utilities are not connected to the larger Railbelt grid.

Power Generation Infrastructure in Urban Alaska

Installed generation capacity on the road system and Juneau, 2019.

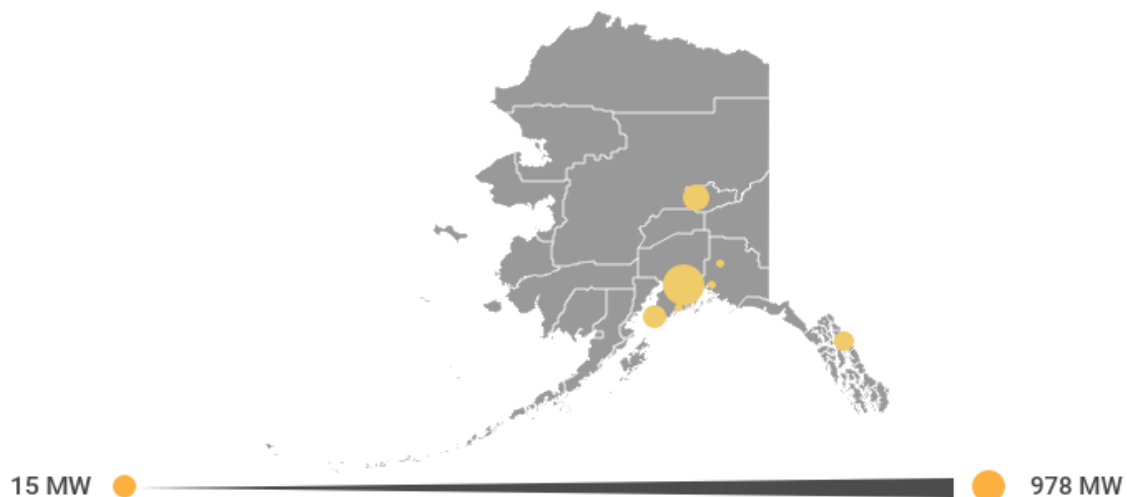


Figure 23: Installed generation capacity on the road system and Juneau, 2019. Source: EIA.

In 2021, the sale of Municipal Light and Power to Chugach Electric Association consolidated two of the electric utilities serving the Anchorage area into one. The Railbelt has been working toward the creation of an electric reliability council tasked with the creation of reliability standards, coordinating joint

resource planning, and ensuring consistent interconnection protocols.⁵⁷ Furthermore, Governor Mike Dunleavy introduced legislation in February 2022 that would create a renewable portfolio standard on the Railbelt. The proposed legislation also includes a commitment to transitioning the Railbelt energy portfolio to 80% sustainable power by 2040.⁵⁸

Remote communities and industry sites across Alaska are powered by a diverse mix of islanded microgrids. Most microgrids in Alaska are dependent on diesel powered generation. However, generation sources can vary according to the resources available in the area. One commonality is small size; community micro-grids across Alaska range in size from 500 kW to 48 MW.⁵⁹

Power Generation Infrastructure in Rural Alaska

Installed generation capacity in rural communities, 2019.



Figure 24: Installed generation capacity in rural communities, 2019.
Source: EIA.

Resilience

Alaska's economy has faced a series of shocks in recent years. Some were caused by natural occurrences, like wildfires, earthquakes, and the COVID-19 pandemic. Others were the result of national and global political and market forces, like volatile oil prices, rapid inflation, and workforce shortages. Though many of these events were individually unpredictable, disruptive occurrences are a reality, elevating Alaska's need for economic resilience.

"Resilience" is a broad term with multiple meanings, but this CEDS refers to economic resilience as described by the U.S. Economic Development Administration (EDA). According to the EDA, economic resilience has three attributes, entailing the ability to:

- Recovery quickly from a shock;
- Withstand a shock; and,
- Avoid a shock altogether.

Resilience Threats

Shocks or threats to economic vitality can be unpredictable. In 2019, very few would have predicted a global pandemic lasting more than two years was just over the horizon. Nonetheless, recent history and situational awareness informs the process of identifying potential hazards so that they can be proactively addressed. Various types of shocks capable of disrupting the economic life of Alaskans are described below.

COVID-19 and other public health crises. The COVID-19 pandemic disrupted almost every aspect of Alaska's economy. The state lost 40,000 jobs in spring 2020 at the pandemic low point, with some industries like tourism, food service, and hospitality hit especially hard.⁶⁰ Like the rest of the country, Alaska saw businesses close, workers laid off, and increased demand for public assistance. More business was conducted online than ever before, which further highlighted Alaska's need for affordable, high-quality broadband internet. As of July 2022, 64.6% of Alaskans are vaccinated against COVID-19, and caseloads had come down from their peaks.⁶¹ However, new variants and future outbreaks remain a major concern.

Inflation, recession, and cost of living. Over the last two and half years, the U.S. has experienced an unprecedented recession followed by record-breaking inflation, and Alaska is no exception from the nationwide trends. Alaska already has a higher cost of living than the U.S. average, and the economic disruptions of COVID-19 exacerbated many existing challenges related to the price of fuel, food, housing, and other necessities.

Job loss and workforce shortages. After dramatic job losses in 2020, Alaska is now experiencing a workforce shortage. Businesses are struggling to hire staff, especially seasonal positions like those in the tourism and seafood industries. Moreover, many essential positions like teachers, nurses, and other health care workers, remain unfilled. One cause of this shortage is a lack of available housing which presents a large barrier to hiring, especially for seasonal workers in communities with a relatively small year-round population and reliance on summer industries like tourism and seafood. In an example from the 2022 Statewide CEDS survey, one business owner cited several potential employees accepted job offers that they later declined because they could not find anywhere to live.⁶²

Infrastructure vulnerability. Much of Alaska’s infrastructure, including roads, ports, airports, and powerlines, is aging or deteriorating. Alaska imports most of its food and other essential products from the Lower 48 and abroad and relies on ports and roads that are in need of maintenance. Furthermore, single-point-of-failure infrastructure makes transportation systems extremely vulnerable to disasters. For example, an avalanche or rockslide can leave a community stranded and cut off from the rest of the state if it blocks the only road access.

Climate change. Alaska’s economy and broader way of life has a strong connection to its unique environment. Economic Engines like oil and gas, mining, fisheries, timber, and tourism all depend on access to Alaska’s natural resources. Climate change threatens these industries and the Alaskan way of life. Melting permafrost, coastal erosion, ocean temperatures, and changing flow levels in streams and rivers threaten critical infrastructure, housing, and barge access to deliver fuel and other goods, with some entire communities needing to relocate. Higher temperatures are affecting ice formation in winter, which many residents of Rural Alaska depend on for subsistence hunting and transportation.

Seismic events. Alaska’s location on the Pacific “Ring of Fire” means it is vulnerable to natural disasters like earthquakes, tsunamis, and volcanic eruption. Most earthquakes are small and do not cause significant damage. However, larger earthquakes can be destructive, like the 2018 earthquake in the Southcentral region. In some parts of the state, including the Kenai Peninsula, the Alaska Peninsula, and the Aleutian Islands, seismic events can trigger a tsunami, which have the potential to be devastating. Volcanic eruption can trigger earthquakes and emit ash, which can ground flights and cause hazardous air quality.

Wildfires. Summers in Alaska virtually guarantee some wildfire activity, which can threaten lives, property, and public health when it occurs near population centers. Fires regularly cause unsafe levels of smoke in communities throughout the state, especially in Interior, Southcentral, and Southwestern Alaska. This can also be a deterrent to tourism and other kinds of economic activity.

Floods and coastal erosion. Many Alaska communities are located on major rivers with a history of flooding, or coastal areas facing erosion. Communities like Utqiagvik and Shishmaref have suffered property and infrastructure damage from winter storms. The Yukon-Kuskokwim Delta village of Newtok had to be relocated in 2019 due to flooding and erosion.

Fisheries disasters. Seafood is a \$5.7 billion industry in Alaska that many communities rely on.⁶³ Natural fluctuations in fish biomass create some uncertainty, which other environmental threats like climate change amplify. Salmon runs for some species have been decreasing in parts of the state, leading to reduced caps on catches or fishery closures. Other fisheries, like the cod in the Gulf of Alaska, have also experienced biomass declines and allowable catch reductions. This results in lost income for commercial fishers and reduced recreational opportunities for sport fishers. Fishery population drops can have devastating impacts on subsistence fishing communities that depend on them as major food sources throughout the year.

Single-industry dependence. Alaska as a state relies on a few key industries, or Economic Engines, that support its economy, including oil and gas, mining, seafood, and tourism. Disruptions to these industries are often factors beyond Alaska’s control but severely impact the state’s economy. Many of Alaska’s regional economies are dependent on just one or two of these industries, and shocks to them can be devastating. Much of the state government’s revenue depends on the price of oil, which fluctuates

unpredictably. Low oil prices can trigger a recession as it impacts direct industry employment and state spending and services.

Subsistence resource threats. Alaska Native people have subsisted on their ancestral lands for thousands of years. Hunting, fishing, and foraging are essential to traditional ways of life in Alaska. They are also critical to food security, as supply chains to remote Alaskan communities are easily disrupted. Low salmon runs, fishery closures, natural disasters, and regulations limiting hunting and fishing can threaten food security in much of Alaska.

Resiliency Action Strategies

During the resiliency challenges over the last five years many organizations throughout the state have partnered to respond to such events. Experiences from these events provide learning opportunities to better anticipate future jolts to the economy. Planning for shocks and disruptions to the economy is critical for resiliency. There are tools that the State of Alaska, local governments, businesses, and other organizations can utilize for anticipating and responding to resiliency challenges.

Pre-disaster planning. When a negative event occurs, an efficient response is essential. Coordination between state, regional, local, and tribal governments, non-profit organizations, and private sector businesses in response to a disaster can pay off by reducing damage and speeding up recovery. Planning efforts should anticipate events known to occur in the state, like earthquakes and wildfire, and have a strategy to respond to unprecedented emergencies, like the COVID-19 pandemic.

Import substitution. Alaska is at the end of the global supply chain, meaning higher prices and increased vulnerability to disruptions. The Port of Alaska in Anchorage represents a single point of failure for the supply of food and other essential goods for most of Alaska. From there, products are distributed by truck or rail throughout the road system and barged or flown to communities off Alaska's road system. Alaska has very little agriculture, and relies almost entirely on importing food, except for subsistence activities (which would not sustain Alaska's entire population).

Access to capital. Disasters can be devastating to businesses, especially if they lack the resources to withstand lost revenue or incur unexpected expenses. This can mean layoffs for workers, reduced hours, and permanent closure. New, seasonal, and nontraditional businesses like commercial fishers, of which Alaska has many, are particularly vulnerable. Access to emergency capital after a disaster keeps Alaska's business afloat, its workers employed, and its economy running.

Broadband access and affordability. The COVID-19 pandemic highlighted Alaska's critical need for access to affordable, reliable broadband. Employees that were able to work from home, the K-12 and university systems transitioned to online learning, and community gatherings went virtual, all of which demanded broadband. Alaska pays higher internet costs than the national average, and the difference is particularly pronounced in rural communities, where residents often pay hundreds of dollars per month for slow, unreliable internet access or go without it entirely. With more business than ever before conducted online, Alaska needs to improve access across the state to thrive in today's global economy. As described in other sections of this document, Alaska is the focus of large amounts of broadband funding in the future.

Streamlining job access and training. Labor shortages underscore the need for a well-trained workforce that employers can readily access. This means aligning training and certificate programs with

occupational demand, and making them easy to access. It also includes the use of remote and digital tools when possible.

Ensure infrastructure reliability. Much of Alaska’s critical infrastructure requires substantial capital investment to extend its lifespan and mitigate risks of failure. This includes transportation infrastructure as well as power and telecommunications linkages. The 2021 Federal Infrastructure Investment and Jobs Act (IIJA) includes funding specifically to increase the resilience of critical infrastructure.

Emerging Sectors. A resilient economy is a diverse economy, and the state is actively pursuing emerging industries to combat vulnerabilities from overreliance on a few large economic drivers. The Emerging Sectors identified in this CEDS have the potential to grow into large industries that leverage Alaska’s unique features as strengths.

Support and grow entrepreneurs. Investing in emerging industries that diversify the economy means supporting and growing Alaska’s innovators and entrepreneurs, and encouraging them to keep their operations in state. Entrepreneurs seeking the venture capital route and those seeking nontraditional models like employee-owned cooperatives contribute uniquely to the state’s economy.

Connectivity, communication, and coordination. Coordination between the different public and private entities in Alaska is critical to an effective disaster response. ARDORs and other economic development organizations across the state consistently serve as a bridge between small businesses, nonprofits, and governmental entities. Building networks and task forces that can be activated during a crisis or disaster is one important component of pre-disaster planning.