



Growth Projections

OVERVIEW OF ALASKA REMI MODEL

The Alaska Regional Economic Model Inc. (REMI) was developed for Northern Economics (NEI) in a collaborative process with Regional Economic Models, Inc.

The Alaska REMI model, a dynamic multi-year forecasting tool, has been designed specifically to overcome theoretical issues inherent in “static models” such as IMPLAN. All REMI Models incorporate a complete input-output model, as well as a robust general equilibrium model, a population cohort model, and an economic geography model. The combination of these tools results in a model, that in conjunction with information on direct changes from the F-35 beddown, will yield realistic estimates of borough-wide changes in employment and population in the FNSB. The Alaska REMI model was customized to specifically recognize the relationship between population and employment, as well as the inherent population growth through migration and natural growth that is expected to occur over time.

NEI utilized the Alaska REMI Model to develop a robust and reliable forecast of the population and employment impacts of the F-35 beddown. The model uses a complex set of historical trends and data sources that help identify relationships between different economic indicators and predict the impacts of certain changes.

REMI can provide economic projections through 2060. The project team selected the 2030 timeframe based on the time needed to show the full impacts of the F-35 expansion on the FNSB economy. Initially, there will be far more jobs created through construction and construction support, but further out, especially beyond 2022 when most construction will be complete and F-35 personnel would have

arrived, those indirect and induced jobs will reduce until the impacts are more constant over time. 2030 is an appropriate window to draw impacts out to their full lifespan. Additionally, the REMI baseline, which can be affected by an infinite number of unexpected economic shocks, becomes less certain the further the outlook. The F-35 impacts estimates are much more certain in 2030 because that labor force and population is explicitly defined, regardless of what’s going on in the baseline economy.

The Alaska REMI model is a top-down forecasting model, using econometric relationships from historical data to project future outcomes within the local and national context. REMI forecasts start with a national forecast of future economic activity. The national forecast is the driver of change in the state level forecast, and then state level forecasts becomes the driver of change in the regional level forecast. The speed of economic responses is also estimated, since different adjustment periods will result in different policy recommendations and different economic outcomes. All forecasts rely on a broad and consistent set of historic economic and demographic indicators generated by the U.S. Census Bureau, the U.S. Bureau of Labor Statistics, and the U.S. Bureau of Economic Analysis.

For more detailed information on REMI, visit www.remi.com.

METHODOLOGY

Baseline Projections

NEI used the Alaska REMI model to predict the projected population, employment and other changes in the FNSB as a result of the F-35 beddown. As a start, the team developed the baseline forecast for the region, or the projected population and employment numbers for the FNSB assuming status quo, with no additional changes or impacts such as the F-35 beddown. The baseline forecast for FNSB comes standard with the Alaska REMI model and projects population, employment, demographic, and other economic variables through 2030. The baseline forecast is the “control” against which the potential scenario is evaluated. In this case, the scenario is the revised forecast that captures the direct changes expected to occur with the F-35 beddown.

The historic population estimates in the REMI model come from the Alaska Department of Labor and Workforce Development (DOLWD) and the U.S. Census Bureau. The baseline regional economic forecast is largely derived from national Bureau of Labor Statistics (BLS) and Bureau of Economic Analysis (BEA).¹ This forecast is estimated through a system of equations that estimates the region’s share of state and national employment, product, migration, etc. Most important – the REMI model uses both historical datasets to draw basic proportions and trends and historical data from multiple sources to establish statistical relationships over time between local, state, and national historical indicators.

¹ A discussion of REMI data sources can be found in full here: http://www.remi.com/wp-content/uploads/2017/10/Data-Sources-and-Estimation-Procedures-v2_1.pdf. Tables of data references begin on page 60.

A simple, and applicable, example of how the model can “foresee” changes in the future is the relationship between Alaska employment and national commodity prices, such as oil. The model will start with a simple employment assumption from the BEA. The model will next look back through history to identify what, if any, relationship has been between oil prices and employment at the state and local level, and if so, to what degree. Once some relationship is established (positive or negative), the model adjusts the base employment over time by that amount. The REMI model estimates these types of relationships at the state and regional level, since what is positive for one economy may be negative for another.

A change in any national or state indicators would likely not immediately impact the local level, or FNSB in this case. For this reason, REMI equations also estimate the speed at which a change in the national or state forecast effects the regional or local level. These relationships are also established through historical data. For example, the same equations that estimate how employment reacts to national oil prices, also observe how fast those reactions occur within larger or smaller populations. The larger the population, the more diverse the economy, and the less impact and slower rate at which national trends will impact the local economy. This estimated delay helps explain the delay we see in the baseline employment declines in FNSB.

The Eielson Regional Growth Plan team made two customized exceptions to the baseline projections:

First, the REMI model incorporated recent (2016 and 2017) population and employment data. This was an important modification because without this data, the historical trends were not fully capturing Alaska’s recession, and with 2016 and 2017 added, the baseline should more accurately reflect the

current economic and population declines due to the statewide recession.

Second, the baseline forecast for military was also customized to create a stable and constant baseline military presence in the FNSB; the standard REMI forecasts assume that military populations in all areas will decline in the future in line with the long-term national trend for the size of the active duty military population.

F-35 Beddown: Direct Impacts are Input into Alaska REMI Model

To incorporate F-35 beddown impacts to the FNSB, NEI identified three specific phases to insert into the Alaska REMI model. These phases are direct estimates and known effects on the local economy. For each component, NEI identified a set of variables to input into the Alaska REMI model's calculations. The three phases include: 1) Construction, 2) Personnel Build-up; and 3) Full Operations. The inputs for each of the components are summarized in more detail below.

Direct Input: Construction. A total of \$324 million in construction spending was entered into the Alaska REMI Model to capture anticipated FNSB construction growth. Construction inputs are based on the following primary sources of information:

1. U.S. Under Secretary of Defense (Comptroller), Department of Defense Budget.²
2. Federal Business Opportunities.³
3. Electronic communications August 2017 through May 2018 with Kevin Blanchard, 354 FW/F-35 Director; Michael Levelier, Contracts Officer for EAFB; Michelle Mandel, Contracting Officer for the U.S. Corps of Engineers; and Nathan Bergerbest, Deputy

² <http://comptroller.defense.gov/Budget-Materials/>.

³ <https://www.fbo.gov/index?s=main&mode=list&tab=list&tabmode=list>.

Chief of Staff for U.S. Senator Lisa Murkowski (Alaska).

Inputs include:

1. \$177.3 million for EAFB projects (of an approximate \$532 million⁴, FY 2018 through FY 2030). This estimate, with approximately 33.3 percent of total contract dollars going to FNSB contractors, is based on known FY18 through FY21 budget allocations⁵, contract awards, contractor origins (i.e., FNSB community-based or not), and estimated annual spending for F-35 operations, 2021-2030.
2. \$6.1 million for Fort Wainwright projects (of an approximate \$18 million⁶, FY 2018 through FY 2021). This estimate, with approximately 33.3 percent of total contract dollars going to FNSB contractors, is based on known FY18 through FY21 budget allocations, contract awards, and contractor origins (i.e., FNSB community-based or not).
3. \$63.8 million for Fort Greely projects (of an approximate \$191 million⁷, FY 2018 through FY 2021). This estimate, with approximately 33.3 percent of total contract dollars going to FNSB contractors, is based on known FY18 through FY21 budget allocations, contract awards, and contractor origins (i.e., FNSB community-based or not).

⁴ The remaining approximate \$354.7 million in construction projects on EAFB are projected to go to Anchorage and Mat-Su-based contractors.

⁵ FY16 and FY17 dollar amounts are not included, as those "economic impacts" or "shocks" to the economy have been considered in the Alaska Department of Labor and Workforce Development Employment and Wages data for 2016 and 2017.

⁶ The remaining approximate \$11.9 in construction projects on Ft. Wainwright are projected to go to other Alaska contractors (outside of the FNSB community).

⁷ The remaining approximate \$127.2 in construction projects on Ft. Greely are projected to go to other Alaska contractors (outside of the FNSB community).

4. \$76.9 million for Clear Air Force Station projects (of an approximate \$308 million⁸, FY 2018 through FY 2021). This estimate, with approximately 25 percent of total contract dollars going to FNSB contractors, is based on known FY18 through FY21 budget allocations, contract awards, and contractor origins (i.e., FNSB community-based or not).

Additionally, the estimated project period and associated dollar amount is input into the model for every project. This level of detail is critical to understanding the timing and intensity of growth resulting from F-35 spending on EAFB. For example:

- A project estimated to start January 1, 2019, with a completion date of June 30, 2020 (547 days), with a total cost of \$10,000,000;
- Spending has been evenly allocated across the project period, on a per day basis, or, $\$10,000,000/547 =$ Approximately \$18,282 per day, across the project period (1/1/19 through 6/30/20).

Direct Input: Personnel Build-up. The personnel build-up phase includes active duty and civilian personnel (along with their families, or dependents) that will come to EAFB as part of the F-35 mission between 2017 and 2022. These include 1,353 active duty personnel, 66 federal civilian employees, 55 technical consultants, and an estimated 1,783 dependents. An overview of arrival times for F-35-related active duty military personnel on EAFB is shown Figure 1. The active duty personnel and the civilian hires are added to the REMI model as “additional employees” within the FNSB, while their dependents are added as additional population.

By adding these new personnel, we also add income and income supplements that are paid to military personnel such as basic allowance for housing. The EAFB population growth estimates for this plan came from the estimated EAFB personnel timeline and the construction projects planned for the Fairbanks area related to the F-35 beddown, as shared directly by Air Force leadership and planners. The personnel timeline includes details such as the anticipated arrival time and projections on the rank, marital status, number of dependents and other characteristics of expected F-35 active duty personnel; much of this information has been applied to the housing discussion to estimate housing needs and available supply (and gaps) for incoming EAFB personnel and their families.

When inputting new personnel into the model, the project planning team assumed 100 percent of technical consultant positions and 80 percent of new Department of Defense civilian employee positions will be filled by persons already employed by Lockheed Martin or at Air Force bases outside the FNSB. These civilian employees and technical consultants would become permanent residents. All active duty personnel will regularly rotate in and out of EAFB, typically serving three-year assignments. This means after the transition period, approximately one-third of all active duty personnel will leave FNSB each year to be replaced by new personnel, who are demographically similar to the outgoing personnel.

⁸ The remaining approximate \$231.1 in construction projects at Clear Air Force Station are projected to go to other Alaska contractors (outside of the FNSB community).

FIGURE 1: ESTIMATED ARRIVAL TIME OF EAFB PERSONNEL BY CALENDAR YEAR

Year	2017	2018	2019	2020	2021	2022	TOTAL
Active duty personnel added to EAFB	18	9	77	465	617	166	1,353
EAFB dependents (using multiplier of 1.3)	23	12	100	605	802	216	1,758

By adding in the approximately 121 federal employees and technical consultants and their families, the project team projects there will be an additional 3,256 direct employees and dependents by 2030.

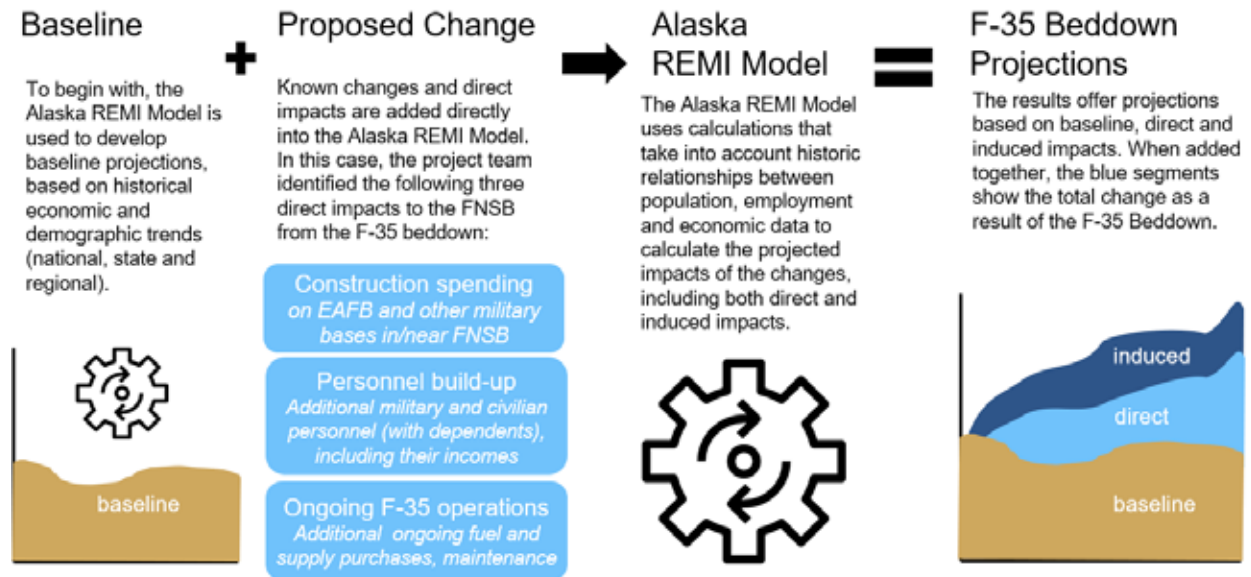
While direct personnel build-up estimates are useful, they do not account for all the anticipated population growth resulting from the increase in economic activity created by the increased population and new construction. To make a fully developed projection of population growth after the F-35 beddown, the Alaska REMI model uses the direct inputs to anticipate changes to baseline births, deaths and migration in the FNSB, which are considered “induced” changes. These induced changes are factored into the growth projections below.

Direct Input: Full Operations. The operational phase begins in late 2022, once the full complement of additional personnel has arrived at Eielson. During the operational phase, purchases of jet fuel and coal continue, as do expenditures for base maintenance. These base maintenance levels are included because they will be greater than pre-F-35

levels and are considered an ongoing addition to the baseline activity. In addition, the ongoing cycle of personnel rotations every three years as military personnel undergo permanent change of station (PCS) to other military bases creates a significant boost in the demand for household moving services in the FNSB, and was therefore entered as an additional direct impact into the Alaska REMI model.

After adding these inputs, the REMI model is run, and the revised forecast (relative to the baseline) is generated. The revised forecast is then compared to the control (baseline) forecasts, and the differences are calculated. The differences between the baseline forecast and the revised forecast are the impacts of the F-35 beddown. Figure 2 depicts a simple graphic outlining the Alaska REMI model methodology.

FIGURE 2: OVERVIEW OF THE ALASKA REMI MODEL METHODOLOGY



PROJECTIONS

This section contains a brief summary of findings from the Alaska REMI Model projections. For detailed tables and figures, visit the Growth Projections Appendix. For further discussion on the fiscal impacts of the F-35 beddown on the local, regional and state economy, see the Fiscal Impacts focus area. For further discussion on projections of school-age children, see the Education and Early Childhood Education focus area. For more information on employment and occupational projections, refer to the Workforce Development focus area.

Population Projections

Alaska REMI model projections indicate the FNSB will see a 5.4 percent increase over baseline population numbers over the coming years, for an estimated “increase” of 5,671 residents in FNSB by 2030. In other words, there will be approximately 5,671 residents in the FNSB that would otherwise not be in the community, were it not for the F-35

beddown. There are two primary factors driving this increase, summarized below, and available in table form in Figure 3 and graphical form in Figure 4.

- An estimated direct increase of 3,256 active duty personnel, civilians, consultants and dependents by the year 2022 arriving through the F-35 beddown.
- Indirect population growth of 2,415 by the year 2030, relative to the baseline. The indirect growth has two components:
 - Induced population growth that occurs as new money is spent, jobs are added, and the economy grows and re-spends in response to the activity from the F-35 beddown. With the addition of the F-35 beddown into the model, FNSB still experiences a net loss of residents due to out-migration, but at a reduced rate from the baseline. The resulting induced population growth seen in the model is more a factor of people deciding to stay in Fairbanks versus more people moving to

Fairbanks; it results in increased retention of existing residents, which shows as induced population growth as a result of the F-35 beddown.

- Natural growth resulting from more births due to the higher population in the FNSB.

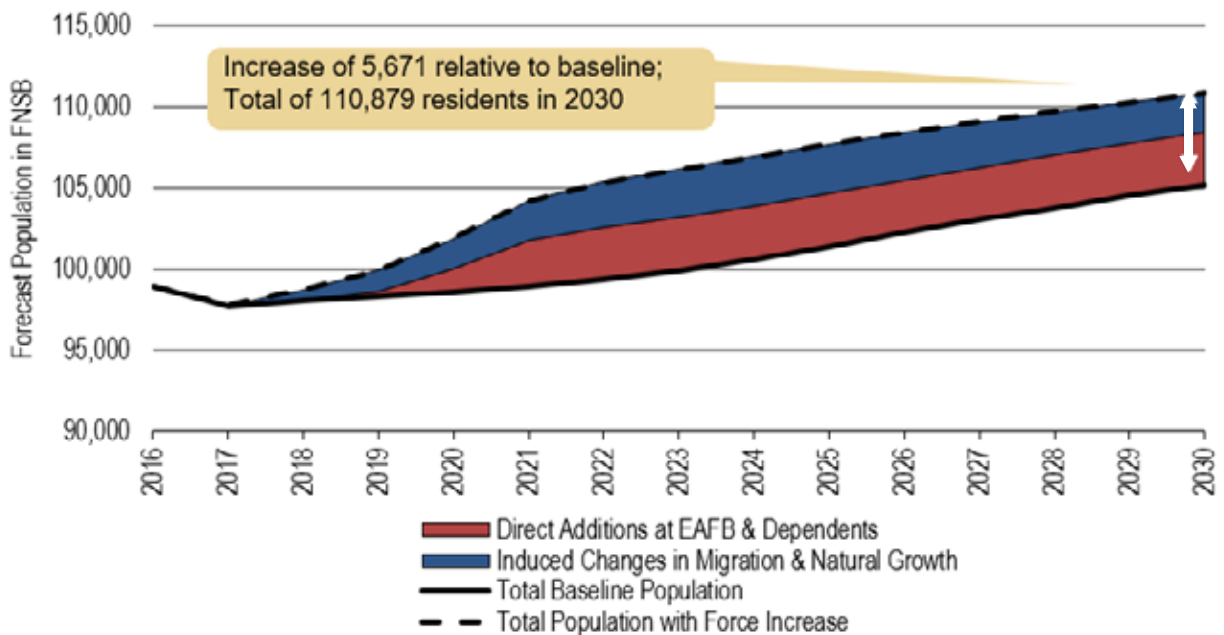
For a detailed table outlining the annual changes in baseline, indirect and total population, refer to Growth Projections Appendix.

FIGURE 3: BREAKDOWN OF FNSB POPULATION INCREASES

Component of Population Change	Estimated Increase	Timing
Direct EAFB Employees and Dependents	+ 3,256	By 2022
Active Duty Personnel	1,353	Start to arrive in 2017
Federal Civilian Employees	66	
Technical Consultants	55	
Dependents of Direct Employees	1,782	
Indirect Growth (includes "Induced" and Natural Growth)	+ 2,415	By 2030
TOTAL	= 5,671 additional/ retained residents	By 2030

Source: Northern Economics; Alaska REMI Model

FIGURE 4. BASELINE AND F-35 BEDDOWN PROJECTIONS OF FNSB POPULATION, 2016–2030

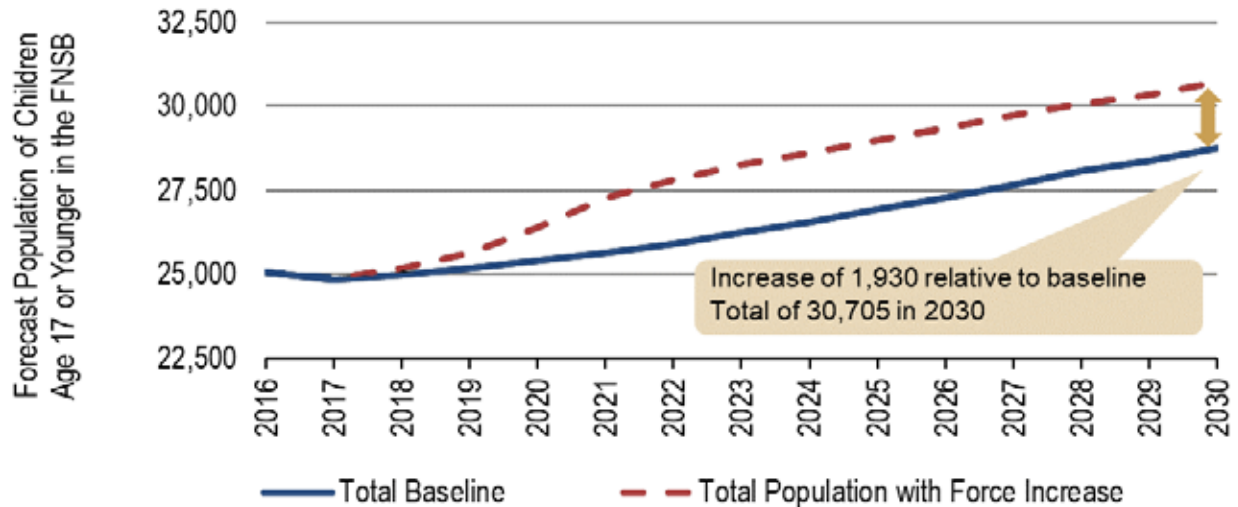


Source: Northern Economics using the Alaska REMI Model

Considering the new Air Force households and induced growth forecasts, the Alaska REMI model estimates that by 2030, FNSB will have an additional 1,930 individuals under the age of 17 above the baseline population without the F-35s, for

an estimated total of 30,705 individuals age 17 and under by 2030 (see Figure 5). These projections are broken down further by year and age group in the Education and Early Childhood focus area of the plan.

FIGURE 5: PRELIMINARY POPULATION PROJECTIONS FOR INDIVIDUALS AGE 17 AND UNDER

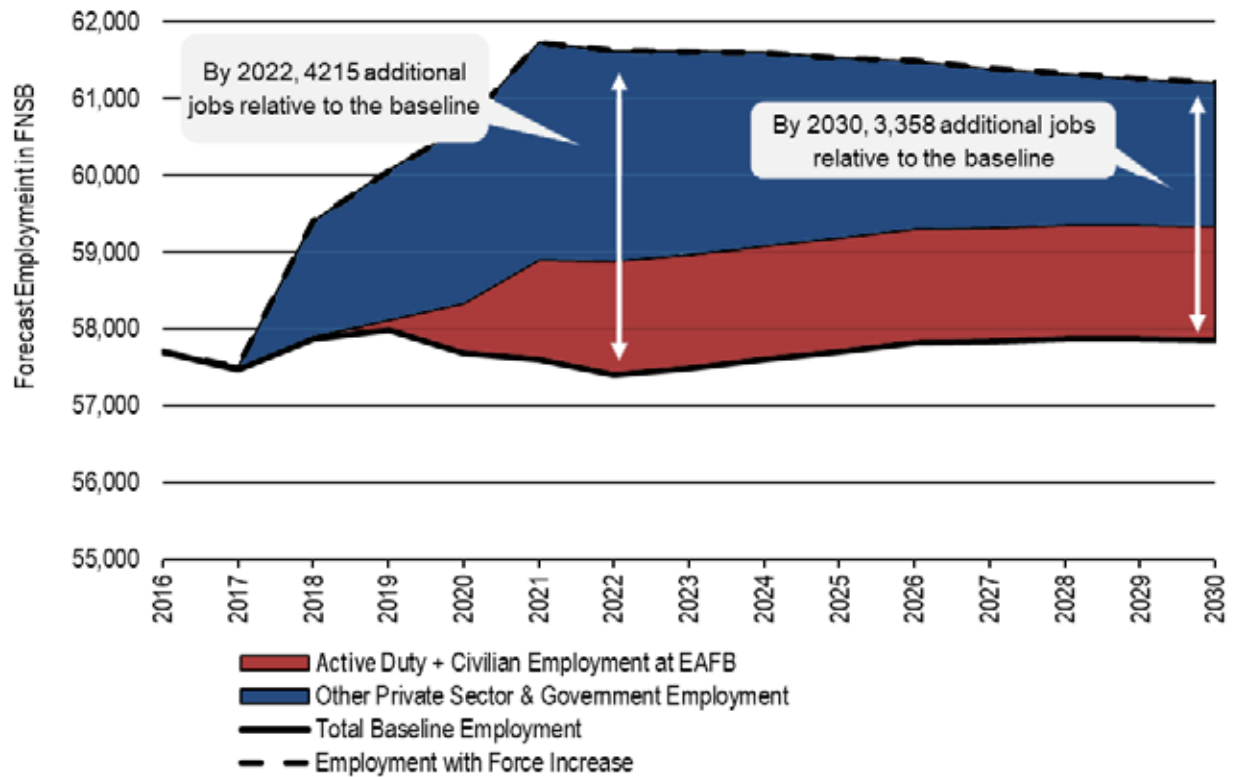


Source: Northern Economics REMI Model

Employment Projections

The Alaska REMI model F-35 baseline employment projections for FNSB forecast relatively flat employment. This stagnation is due to the State’s ongoing economic challenges and the outmigration of working-age residents away from FNSB. The F-35 beddown is expected to create an estimated 4,215 additional jobs relative to the baseline by year 2022, which will slightly decline to 3,358 additional jobs above baseline levels by 2030 (see Figure 6). Construction jobs peak in 2019 and overall jobs peak in 2022 with the full force increase at EAFB, with decreased intensity moving out toward 2030.

FIGURE 6: PRELIMINARY EMPLOYMENT PROJECTIONS FOR F-35 BEDDOWN OPERATIONS AT EAFB

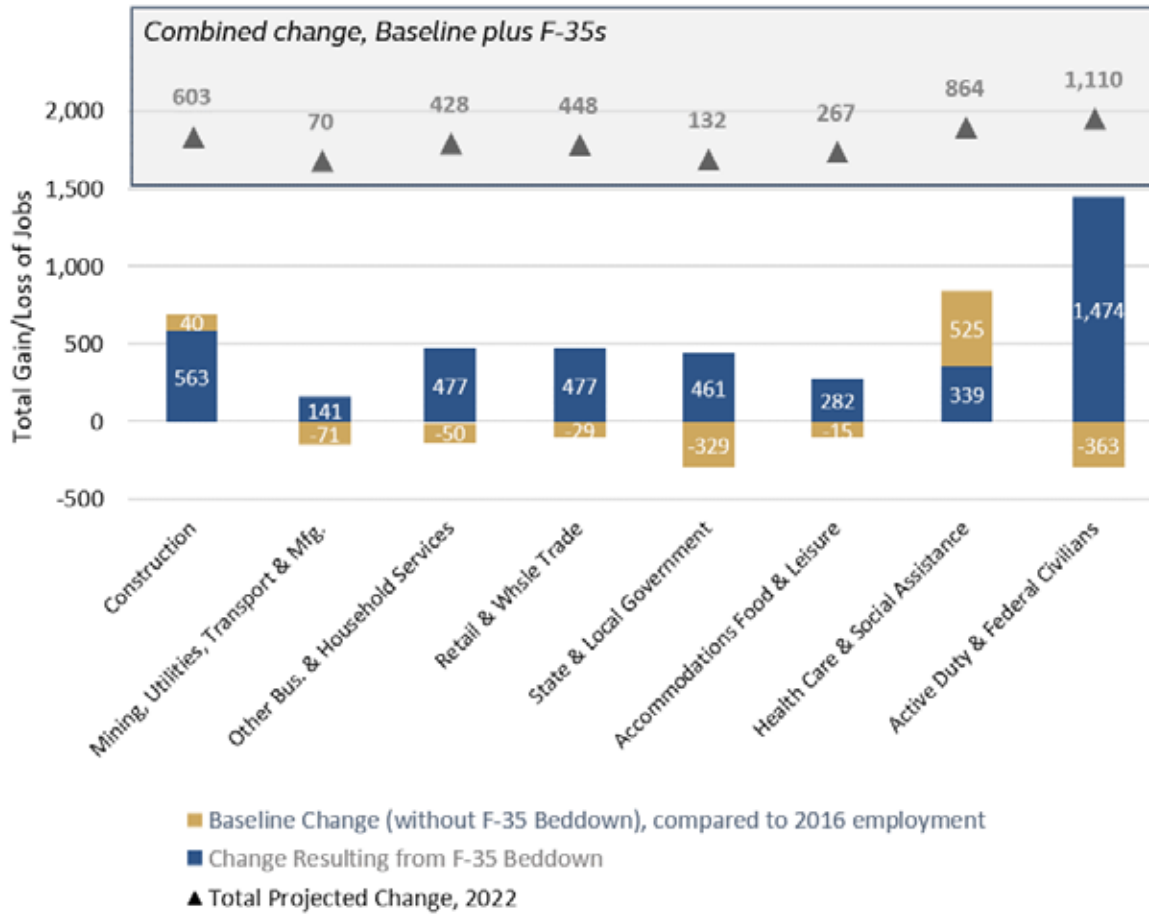


Note: “Civilian Employment” includes federal civilian employees and technical consultants working at EAFB.

Source: Northern Economics; Alaska REMI Model

As shown in Figure 6, approximately one-third of F-35-related gains will be from active duty and civilian employment at EAFB; the remaining are from other private sector and government employment changes. These projections consider both baseline employment projections plus new growth from the F-35 beddown. In some industries, F-35-related growth balances a forecasted decline in baseline employment.

FIGURE 7: FNSB PROJECTED CHANGE IN EMPLOYMENT BY INDUSTRY: 2022, PEAK OF F-35-RELATED GROWTH



Source: Agnew::Beck Consulting with data from Northern Economics; Alaska REMI Model

Figure 7 shows a breakdown of the projected change in employment in year 2022, the peak of F-35-related growth. The light brown bars show the estimated change in the baseline number of jobs for each industry compared with 2016 numbers; the blue bars show the estimated number of new jobs created as a result of the F-35 beddown within each industry category. The grey bar at the top highlights the combined change for each industry; in some cases, such as the state and local government

category, the F-35-related growth projection of 4,614 new jobs nearly balances out the baseline employment losses of 329 jobs for a total increase of 132 jobs. In other categories such as health care and social assistance, both the baseline and the F-35 projections forecast industry sector growth for a combined 864 new jobs.

LIMITATIONS AND EXCLUSIONS

The projections developed in this RGP are derived from historical trends and patterns, with F-35 beddown direct and induced impacts added into the model. As a result, the projections are intended to compare baseline FNSB population and employments with new activity resulting from the F-35 beddown. The projections are not meant to offer a comprehensive prediction of the future FNSB economy. For example, the following trends, changes and potential projects are not factored into the modeling and projections:

- The projections do not include emerging or recent industry changes such as the legalization and expansion of the marijuana industry. The marijuana industry is new and does not offer a robust historical record for inclusion in the REMI Model projections.
- Major changes to resource extraction projects in the region. For example, in the mining industry, the model considers historical mining trends and global mineral prices, but does not include specific inputs such as proposed new mining developments or mining closures. Three of the state's largest mining operations (Usibelli, Fort Knox and Pogo mines) all occur within 150 miles of Fairbanks, and increases or decreases in mining operations have the potential to impact the FNSB economy.⁹ A \$100 million expansion at the Fort Knox Mine due to the Gilmore Tract acquisition will secure high-paying employment demand at the mine until at least 2030.
- The Alaska Gas Line project and the Alaska Interior Energy Project, which seek to bring natural gas and lower-cost energy to the interior.
- Expansion of the Alaska Railroad in the FNSB region.
- Ongoing impacts from the State of Alaska's fiscal crisis, ongoing budget deficits and lack of comprehensive fiscal plan for generating state revenues.
- Development of new infrastructure projects such as a convention center or rail car storage in Fairbanks, and water and sewer distribution systems in and around the City of North Pole.
- Economic and health impacts from water and air quality issues, including the potential for tighter regulations for businesses, industries and homeowners.
- Expansion of the tourism and visitation market due to growing demand from Asia's rising middle class and increasing activity in the Arctic.
- Future military expansion projects such as the recently-awarded missile field expansion at Fort Greely. FNSB also could see growth as additional military units are stationed in the region; for example, the Air Force is seeking out additional locations for the new KC-46 aerial refueling tanker within the Pacific Theater.

The remaining sections of the RGP include by focus area overviews of needs, existing conditions, identified gaps in needs and existing resources, and preliminary recommendations for how to address potential gaps.

⁹ Source: FNSB Comprehensive Economic Development Strategy (CEDS), 2016.