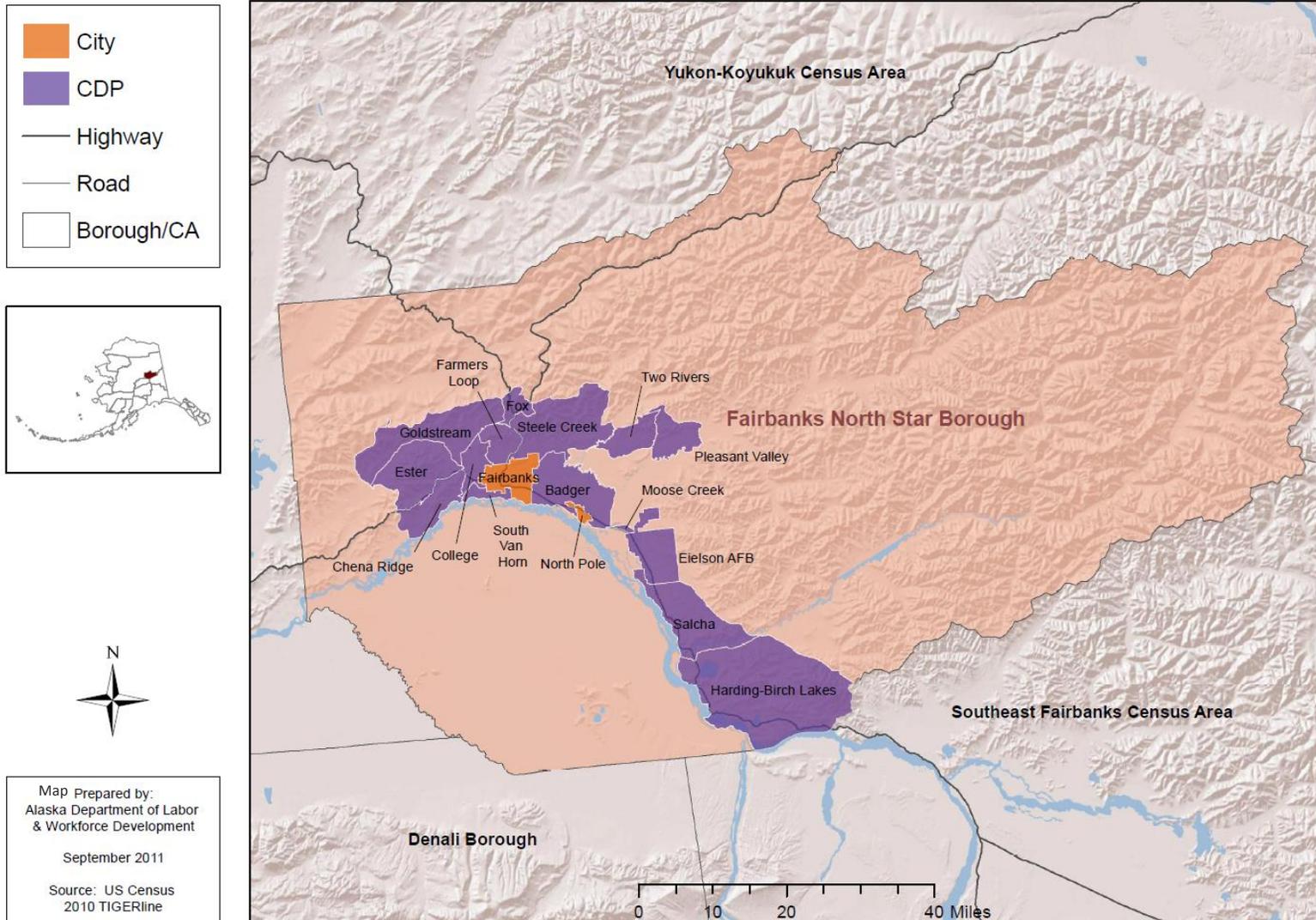


# Fairbanks North Star Borough



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## ***Fairbanks North Star Borough Dashboard***

**Population:** The Alaska Department of Labor and Workforce Development's current (2012) population estimate for the Fairbanks North Star Borough is 100,343—an increase of 21% from 2000.

**Housing Units:** There are currently 41,191 housing units in the Fairbanks North Star Borough. Of these, 35,583 are occupied, 2,111 are for sale or rent, and the remaining 3,497 are seasonal or otherwise vacant units (Profile Figure C6).

**Energy:** The average home in the Fairbanks North Star Borough is 1,844 square feet and uses 143,000 BTUs of energy per square foot annually, 4% more than the statewide average of 137,000 BTUs per square foot per year.

**Energy Costs:** Using AKWarm estimates, average annual energy cost for homes in the Fairbanks North Star Borough is \$8,110, which is approximately 2.9 times more than the cost in Anchorage, and 3.8 times more than the national average (Profile Figure C13).

**Energy Programs:** Approximately 18% of occupied housing in the Fairbanks North Star Borough has completed either the Home Energy Rebate, Weatherization, or BEES programs since 2008, compared to 21% statewide (Profile Figure C12).

**Housing Quality:** Within current housing stock, newer homes have better energy performance. On average, homes built before 1940 are currently rated at 2-stars, compared to a current average rating of 4-star-plus for houses built after 2000.

**Air-tightness:** Within current housing stock, newer homes are tighter. On average, homes built in the last decade perform better than the 2012 BEES standard of 4 air-changes per hour at 50 pascals (ACH50). In contrast, homes built before 1940 are 3.9 times leakier than those built since 2000 (Profile Figure C7).

**Ventilation:** An estimated 23,221 occupied housing units (or 65%) in the Fairbanks North Star Borough are relatively air-tight and lack a continuous ventilation system. These houses are at higher risk of moisture- and indoor air quality-related issues (Profile Figures C9-C10).

**Overcrowding:** 5% of occupied units are estimated to be either overcrowded (3%) or severely overcrowded (2%). This is roughly similar to the national average, and makes the Fairbanks North Star Borough the 17th most overcrowded census area in the state.

**Affordability:** On average, approximately 35% of households in the Fairbanks North Star Borough spend more than 30% of total income on housing costs, which include rent, utilities, and energy costs. Based on average AKWarm estimates, annual energy costs constitute approximately 12% of census median area income for occupied housing.

## Fairbanks North Star Borough Summary

### Community

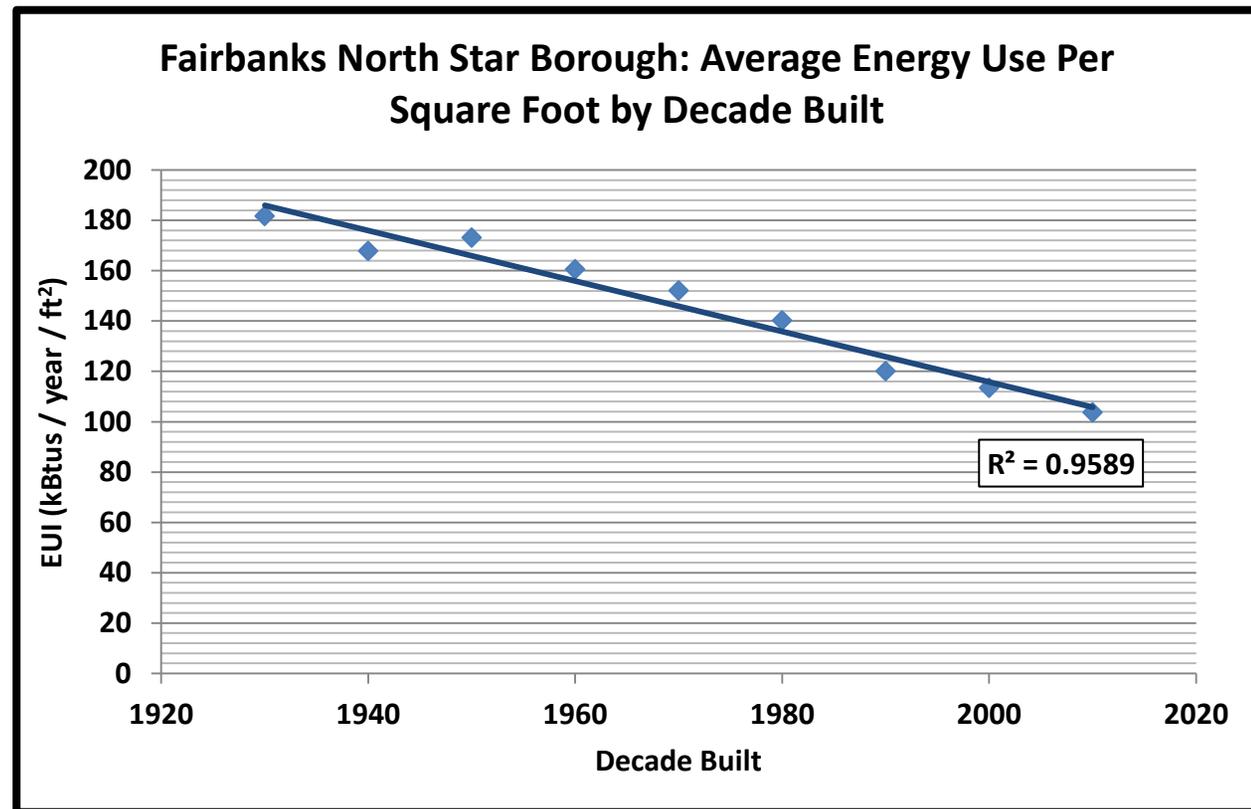
The Fairbanks North Star Borough census area is located in Interior Alaska, and includes the community of Fairbanks, the second largest city in Alaska. The census area lies in the Doyon Native Corporation ANCSA region. The average home size in the census area is 1,844 square feet, a number that has remained relatively stable since 1970, even while national and statewide home size averages have increased.

### Overcrowding

The Fairbanks North Star Borough is the 13th least overcrowded census area in the state, with 5% of housing units estimated to be either overcrowded (3%) or severely overcrowded (2%). The average home size is 1,844 square feet and the average occupancy, at 2.6 people per household, is slightly below the statewide average of 2.67 people per household. According to ACS data, approximately 5% of housing in the census area is available for sale or rent.

### Energy

The Fairbanks North Star Borough census area has the fifth lowest home heating index in Alaska, at 7.7 BTUs/ft<sup>2</sup>/HDD. This indicates



that homes are more energy efficient than in many other census areas. The energy use of homes and energy cost per square foot has been decreasing linearly, indicating a trend toward increasingly efficient houses (Figure C-II).

The Fairbanks North Star Borough census area has the most air-tight housing stock in the state, with an average of less than 6 air changes per hour during a 50 Pascal blower door test. Houses built since 2005 on average already meet the 2012 International Energy Conservation Code tightness requirements. HRV installations have become increasingly common in the census area, with more than half of all homes built between 2005 and 2011 having an HRV installed. However, approximately  $\frac{3}{4}$  of the homes built in the 1960s–80s are relatively air-tight while still lacking a continuous ventilation system. These buildings are at greater risk for moisture- and indoor air quality-related issues.

### **Affordability**

According to ACS estimates<sup>1</sup>, the Fairbanks North Star Borough has the second highest percentage of cost-burdened housing of all census areas in the state, with approximately 35% of all households spending more than 30% of household income on housing costs. These households include both rentals and owner-occupied homes. Nearly half of households living in rental units are cost-burdened.

## **Community, Regional, and Statewide Housing Characteristics**

This census area summary only includes the highlights of housing characteristics at the census area level. Detailed data profile with charts and tables for both the census area and for each of the communities within it follow. The 2014 Alaska Housing Assessment provides a significant amount of data and analysis at statewide, ANCSA region, census area, and community levels. This assessment provides a statewide analysis of housing characteristics, how they compare to national numbers, and the estimated housing needs. Within the 2014 Alaska Housing Assessment, written summaries are available for each individual ANCSA region and census area, and data profiles are available for each community and census area characterizing the housing stock from the perspective of community, overcrowding, energy and affordability. These different tiers of information and analysis allow researchers, housing authorities, policymakers and others to generate answers to specific questions. For a detailed discussion of estimating housing need and comparison of methods to previous Housing Assessments, see Appendix B, "Statewide Need Assessment" of the 2014 Alaska Housing Assessment.

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<sup>1</sup> CCHRC's analysis of ACS energy costs indicate that there are systematic underestimations for rural Alaska, which suggests that ACS-based cost burdened housing estimates are low. See Appendix A, "Analysis of American Community Survey Energy Cost Estimates" for more details.

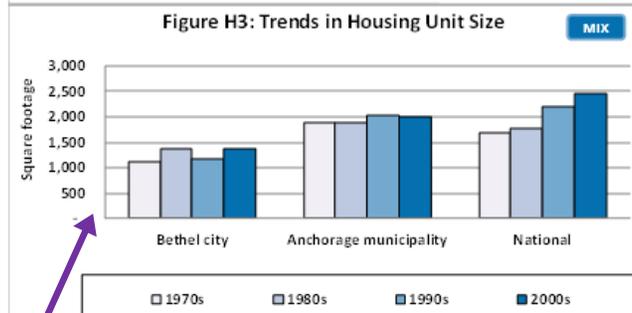
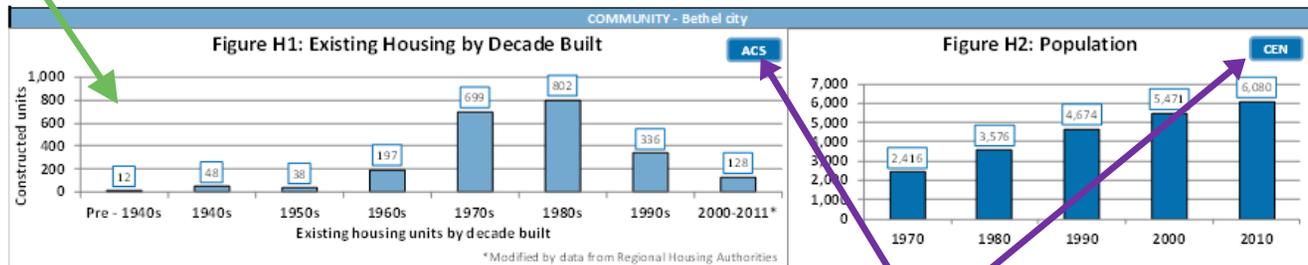
# How to Interpret the Profile: Data Sources, Definitions & Clarifications

1

This graph show the breakdown of *current* housing stock by the decade in which the housing units were built. It does *not* show trends over time.

The Alaska Building Energy Efficiency Standard (BEES) was established by AHFC for the State of Alaska to promote the construction of energy efficient buildings. The standards for specific building components are divided into four climate zones, from Zone 6 in Southeast AK to Zone 9 on the North Slope.

|                             |                                 |   |                     |
|-----------------------------|---------------------------------|---|---------------------|
| Community Profile for:      | Bethel city                     | ANCSA Region                            | Calista             |
| Regional Housing Authority: | AVCP Regional Housing Authority | BEES Climate Zone (Heating Degree Days) | Zone 8 (13,334 HDD) |



**Data Source Key:**

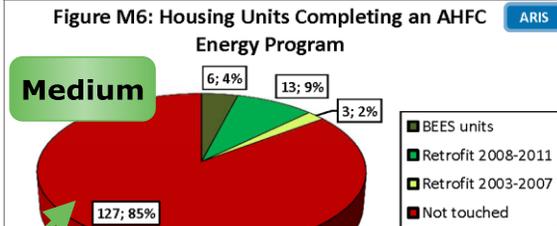
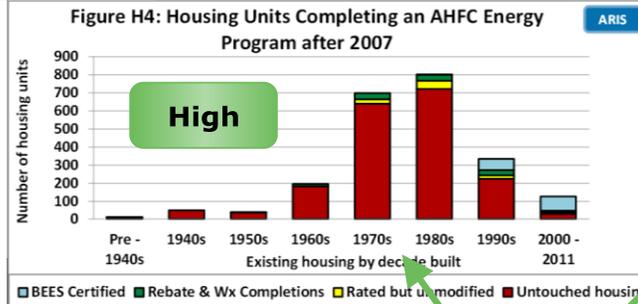
- 2011 American Community Survey 5 year estimates (ACS) **ACS**
- Alaska Retrofit Information System energy audits **ARIS**
- 2010 Decennial Census **CEN**
- Mixed data source; see individual graphs for details. **MIX**

**Data Sources:** National trends come from the 2009 Residential Energy Consumption Statistics published by the U.S. Energy Information Administration. Anchorage and census area data come from the Alaska Retrofit Information System.

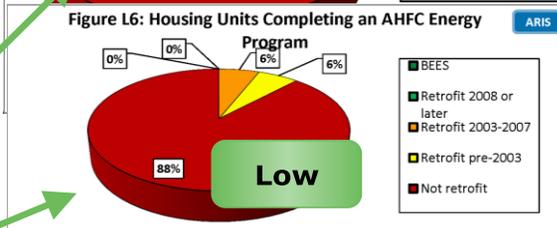
# How to Interpret the Profile: Data Sources, Definitions & Clarifications

1

Energy program activity within communities with high, medium and low amounts of ARIS data available. (See p.7 of "How to Interpret" for detail on data levels).



**Communities - AHFC Energy Program Activity**  
**High Data** - Reported by decade built for the housing units.  
**Medium Data** - Reported by percent of total housing units touched.  
**Low Data** - Have few or no post-2008 Weatherization/Rebate completions or BEES certifications in the ARIS database.



- PCE = Power Cost Equalization
- Average Annual Energy Cost with PCE: The cost to the household after it has been lowered by the PCE subsidy.
- Without PCE: The actual energy cost, including the amount paid by the State for PCE.

**American Community Survey (ACS) Data:**  
**Complete Plumbing:** Includes hot & cold running water, a flush toilet, and a bathtub or shower within the home.  
**Complete Kitchen:** Includes a sink with a faucet, a stove/range, and a refrigerator.

| Houses Lacking Complete Plumbing or Kitchen Facilities | # Households | % Households |
|--|--------------|--------------|
| Lack complete plumbing                                 | 3            | 10%          |
| Lack complete kitchen                                  | 0            | 0%           |

| Estimated Total Community Space Heating Fuel Use by Type |        |           |
|--|--------|-----------|
| Fuel Oil   | 20,816 | (gallons) |
| Nat Gas  | -      | (ccf)     |
| Electricity  | 15,459 | (kWh)     |
| Wood   | 3      | (cords)   |
| Propane  | -      | (gallons) |
| Coal   | -      | (tons)    |

|                                    |         |
|------------------------------------|---------|
| Avg Annual Energy Cost with PCE    | \$5,265 |
| Avg Annual Energy Cost without PCE | \$6,643 |

| Estimated Energy Prices as of January 2013 |        |
|--|--------|
| #1 Fuel oil cost (\$ / gallon)             | \$5.16 |
| Electricity with PCE (\$/kWh)              | \$0.03 |
| Electricity cost without PCE (\$/kWh)      | \$0.27 |

| Weatherization Program Retrofits (funding increased in 2008) |       |
|--|-------|
| Date Range   | Units |
| 2008-2011  | 17    |
| 2003-2007  | -     |
| 1990-2002  | 10    |

| Housing Stock Estimates         |    |
|---------------------------------|----|
| All Housing                     | Nu |
| All Occupied Housing            |    |
| All Housing                     |    |
| Vacant housing for Sale or Rent |    |

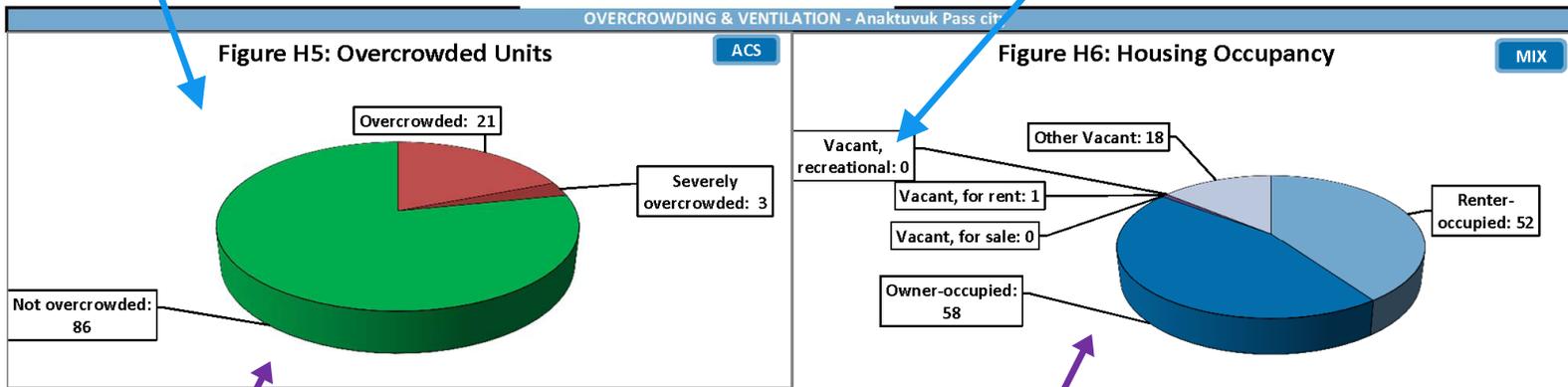
Units weatherized before 2008 are eligible to participate in the program again. (Data source: Alaska Housing Finance Corporation).

## How to Interpret the Profile: Data Sources, Definitions & Clarifications

2

**Overcrowded:** Housing units with more than 1 person per room  
**Severely Overcrowded:** Housing units with more than 1.5 people per room.  
 "Rooms" include bedrooms, living rooms, dining rooms, kitchens, and other finished, separated spaces, but not including bathrooms, porches, balconies, foyers, halls, or unfinished basements.

**Recreational:** For seasonal, recreational, or occasional use.



**Data Source:**  
 2011 American Community Survey 5-year estimates

**Data Sources:** The number of owner-occupied, renter-occupied, and total vacant units are taken from the 2011 ACS 5-year estimates. Data for vacancy type, only available from the decennial Census, were derived by taking the decennial census ratios by vacancy type and applying them to the total number of vacant units.

## How to Interpret the Profile: Data Sources, Definitions & Clarifications

2

**Heat Recovery:** Continuous mechanical ventilation with heat recovery operated with automatic controls.

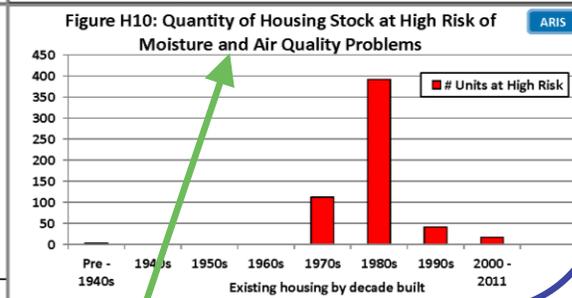
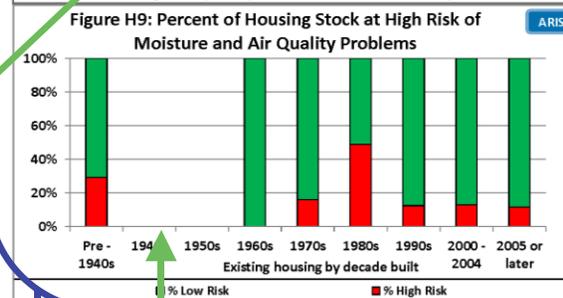
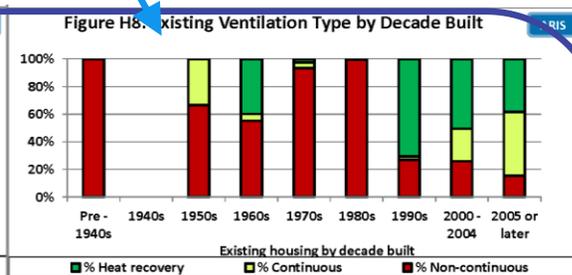
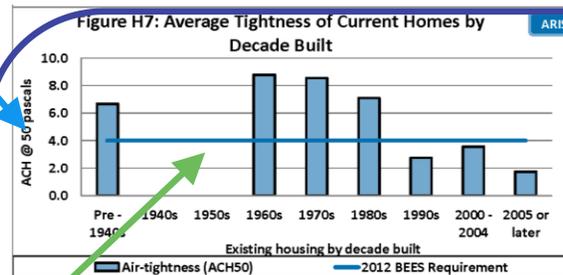
**Continuous:** Mechanical ventilation without heat recovery operated with automatic controls.

**Non-Continuous ventilation:** Includes homes with range and/or bath fans not operated using automatic controls.

**ACH50:** The results of a blower door test to measure building air leakage. Smaller numbers indicate tighter buildings. Tighter buildings lose less heated air to the outside and thus use less energy for space heating.

The 2012 Building Energy Efficiency Standard (BEES) for air-tightness is for reference only, as it was implemented after the majority of homes in Alaska were built.

Data Source:  
Alaska Retrofit Information System



Decades with no bar lack sufficient data for reporting. They should not be considered zero quantities.

**High Risk of Moisture and Air Quality Problems:** Note that moisture or poor indoor air quality have not been physically measured; these houses are considered "at-risk" because they are relatively air tight (less than 0.5 estimated natural air changes per hour) and do not have a continuous ventilation system.

## How to Interpret the Profile: Data Sources, Definitions & Clarifications

3

Rating stars and points are based on AHFC's AkWarm energy rating system.

**Average annual energy cost:**  
Includes all end uses. Costs are estimated using January 2013 energy prices, and include reductions from the PCE program.

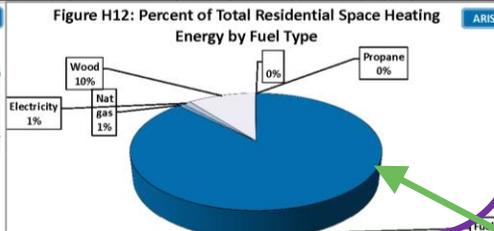
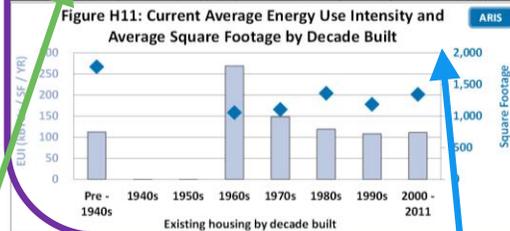
**Space Heating, DHW, Appliances:**  
Estimated annual energy for the end uses of: Space Heating, Domestic Hot Water, and all other energy including lights, appliances, and electronics.

**ECI: Energy Cost Index,** the amount of money spent on energy per year divided by square footage.

The number of AkWarm records from each decade built that were used to calculate the averages reported.

| Current Residential Units by Year Built | Number of Records | Avg Energy Rating | Avg Energy Rating Points | Avg Sq. Feet | Avg Annual Energy Cost (with PCE) | Avg Annual Energy Use (million BTUs) | Avg Ann Energy by Use (million Btus) |     |            | Avg. EUI (kBtu/SqFt) | Avg. ECI (\$ / \$ / SqF) | Avg. Home Heating Index |
|---|-------------------|-------------------|--------------------------|--------------|-----------------------------------|--------------------------------------|--------------------------------------|-----|------------|----------------------|--------------------------|-------------------------|
|   |                   |                   |                          |              |                                   |                                      | Space Heating                        | DHW | Appliances |                      |                          |                         |
| OVERALL                                 | 419               | 3-star            | 70.7                     | 1,237        | \$ 8,065                          | 160                                  | 102                                  | 27  | 26         | 132                  | \$ 6.97                  | 6.5                     |
| Pre- 1940                               | 7                 | 3-star            | 68.3                     | 1,779        | \$ 11,107                         | 199                                  | 145                                  | 21  | 33         | 113                  | \$ 6.66                  | 6.4                     |
| 1940-49                                 | 0                 | NR                | NR                       | NR           | NR                                | NR                                   | NR                                   | NR  | NR         | NR                   | NR                       | NR                      |
| 1950-59                                 | 3                 | NR                | NR                       | NR           | NR                                | NR                                   | NR                                   | NR  | NR         | NR                   | NR                       | NR                      |
| 1960-69                                 | 15                | 2-star            | 52.3                     | 1,056        | \$ 11,087                         | 287                                  | 225                                  | 35  | 27         | 269                  | \$ 10.60                 | 16.0                    |
| 1970-79                                 | 71                | 2-star plus       | 64.5                     | 1,106        | \$ 7,961                          | 153                                  | 105                                  | 21  | 25         | 149                  | \$ 8.09                  | 7.8                     |
| 1980-89                                 | 113               | 3-star plus       | 74.7                     | 1,361        | \$ 8,239                          | 157                                  | 100                                  | 30  | 26         | 119                  | \$ 6.40                  | 5.8                     |
| 1990-99                                 | 111               | 4-star            | 79.9                     | 1,187        | \$ 6,395                          | 122                                  | 57                                   | 21  | 20         | 108                  | \$ 5.58                  | 4.7                     |
| 2000-2004                               | 71                | 3-star plus       | 77.5                     | 1,388        | \$ 8,435                          | 143                                  | 80                                   | 35  | 27         | 118                  | \$ 7.24                  | 5.2                     |
| 2005 or later                           | 28                | 5-star            | 91.9                     | 1,233        | \$ 4,504                          | 92                                   | 39                                   | 28  | 25         | 79                   | \$ 3.82                  | 2.5                     |

**Home Heating Index:**  
The energy used per square foot per year divided by the area's heating degree days.



**Data Source:**  
AkWarm ratings from AHFC's Alaska Retrofit Information System (ARIS).

Average energy characteristics of the *current* housing stock by decade built (high data communities) or by pre-/post-retrofit and new construction categories (medium data communities).

**Energy Use Intensity (EUI)** is the total amount of energy used per year per square foot of floor space.

This is the community's breakdown by fuel type of the energy (BTUs) used for home space heating. It is not the percent of housing using a given fuel in primary space heating devices. Because wood burning devices are inefficient, they may use a significant portion of total energy even if no homes in a community use wood as a primary fuel.

## How to Interpret the Profile: Data Sources, Definitions & Clarifications

3

**Average building envelope characteristics of the *current* housing stock by decade built (high data communities) or by pre-/post-retrofit and new construction categories (medium data communities).**

**ACH50:** The results of a blower door test to measure building leakiness. Smaller numbers indicate tighter buildings.

**R-value:** the capacity to resist heat flow. The higher the value, the better the insulator.

**U-value:** the conductance to heat flow. The lower the value, the better the insulator.

**Data Sources:** AkWarm ratings from AHFC's Alaska Retrofit Information System (ARIS).

**Current Bethel city Housing Envelope Characteristics By Decade Built**

| Current Residential Units by Year Built | Number of Records | ACH 50 | Ceiling R | Above Grade Wall R | Below Grade Wall R | Above Grade Floor R | On Grade Floor R | Below Grade Floor R | Door U | Garage Door U | Window U |
|---|-------------------|--------|-----------|--------------------|--------------------|---------------------|------------------|---------------------|--------|---------------|----------|
| OVERALL                                 | 419               | 6.4    | 23        | 17                 | 7                  | 30                  | NR               | 2                   | 0.36   | 0.27          | 0.54     |
| Pre- 1940                               | 7                 | 6.7    | 26        | 21                 | NR                 | 30                  | NR               | NR                  | 0.30   | NR            | 0.40     |
| 1940- 49                                | 0                 | NR     | NR        | NR                 | NR                 | NR                  | NR               | NR                  | NR     | NR            | NR       |
| 1950- 59                                | 3                 | NR     | NR        | NR                 | NR                 | NR                  | NR               | NR                  | NR     | NR            | NR       |
| 1960- 69                                | 15                | 8.8    | 16        | 14                 | NR                 | 21                  | NR               | NR                  | 0.44   | NR            | 1.65     |
| 1970- 79                                | 71                | 8.5    | 20        | 15                 | NR                 | 29                  | NR               | NR                  | 0.39   | NR            | 0.57     |
| 1980- 89                                | 113               | 7.1    | 29        | 17                 | NR                 | 32                  | NR               | NR                  | 0.30   | NR            | 0.44     |
| 1990- 99                                | 111               | 2.7    | 56        | 31                 | NR                 | 50                  | NR               | NR                  | 0.19   | 0.12          | 0.29     |
| 2000- 2004                              | 71                | 3.6    | 13        | 21                 | NR                 | 36                  | NR               | NR                  | 0.27   | 0.23          | 0.40     |
| 2005 or later                           | 28                | 1.7    | 41        | 22                 | NR                 | 41                  | NR               | NR                  | 0.20   | NR            | 0.31     |
| BEES 2009 - Climate Zone 8              |                   | 7.0    | 38        | 30                 | 15                 | 38                  | 15               | 15                  | 0.22   | 0.22          | 0.22     |
| BEES 2012 - Climate Zone 8              |                   | 4.0    | 48        | 30                 | 15                 | 38                  | 15               | 15                  | 0.22   | 0.22          | 0.22     |

**The number of AkWarm records from each decade built that were used to calculate the averages reported.**

**"NR"** is used when there are insufficient records to protect the confidentiality of the occupants.

**Color Coding--**  
**Green:** the average value meets or exceeds the 2012 BEES requirement.  
**Yellow:** value is 75-99% of the 2012 BEES requirement.  
**Red:** value is less than 75% of the 2012 BEES requirement.

## How to Interpret the Profile: Data Sources, Definitions & Clarifications

4

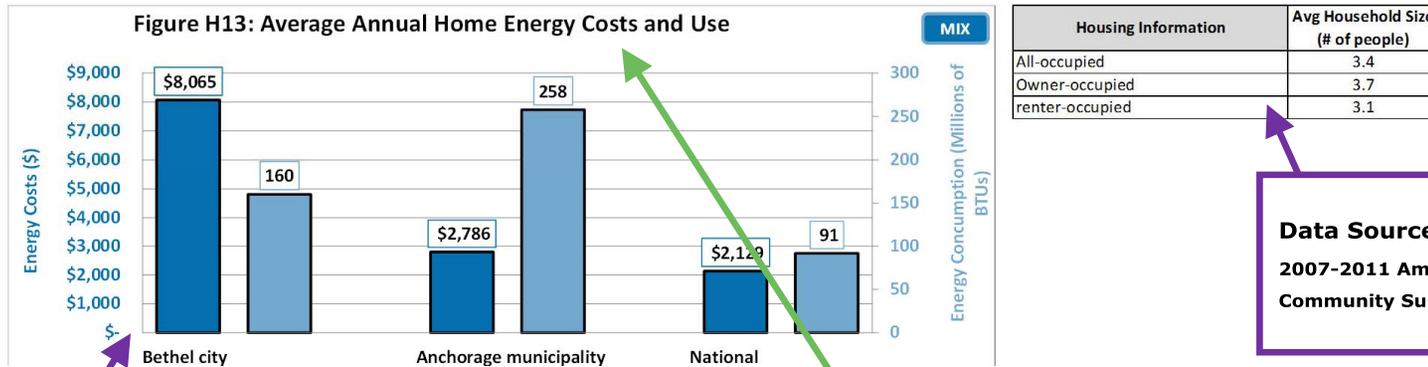
Communities are categorized in this report by the amount of ARIS data available, and reporting is more extensive for locations with more data. Data quantities are defined as--

**High:** ARIS records exist for housing units built in 7 of the 9 date ranges use in this report, and there are either more than 50 records or records totaling 20 percent or more of the total number of housing units.

**Medium:** There are three or more ARIS records. Data are presented for an "overall" group if there are "As Is" ARIS records totaling at least 10% of the community's occupied housing units.

**Low:** There are fewer than three ARIS records for the location.

Community Template - Data Quantity: High



**Data Sources:** Census Area and Anchorage data come from AFHC's Alaska Retrofit Information System. National figures come from the U.S. Energy Information Administration's 2009 Residential Energy Consumption Statistics (RECS) for "cold"/"very cold" climate regions.

Average annual home energy costs and usage estimates are for all end uses, including space heating, domestic hot water, lighting and appliances. Costs are estimated using January 2013 energy prices and include reductions from the PCE program.

**Data Source:**  
2007-2011 American Community Survey

## How to Interpret the Profile: Data Sources, Definitions & Clarifications

4

**Data Source:**  
2007-2011  
American  
Community  
Survey.

"Value" is determined by responses to the ACS question: "How much do you think this house and lot, apartment, or mobile home (and lot, if owned) would sell for if it were for sale?"

Household income includes all earnings from salaries, stocks, gifts, public assistance, etc.

**Data Source:** Median income comes from 2007-2011 ACS estimates; energy costs come from AHFC's Alaska Retrofit Information System (ARIS).

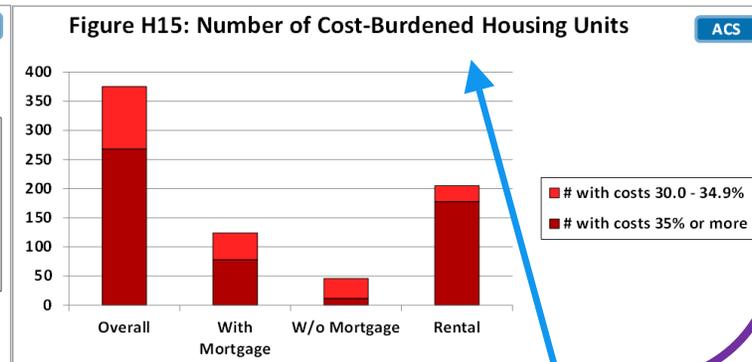
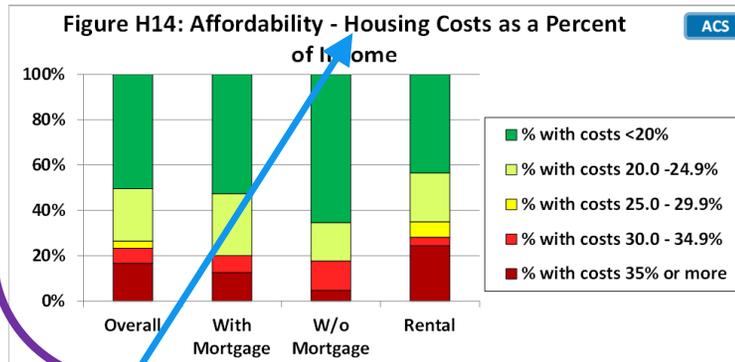
|  |
|--|
| Owner-occupied House with Mortgage,<br>Median Value      |
| \$226,800  |
| Owner-occupied House without a Mortgage,<br>Median Value |
| \$119,600  |

| Median Annual Household Income |                  |
|--------------------------------|------------------|
| Housing Units                  | Household Income |
| All-occupied                   | \$ 91,302        |
| Renter-occupied                | \$ 70,170        |
| Owner-occupied                 | \$ 107,908       |
| w/ mortgage                    | \$ 111,167       |
| w/o mortgage                   | \$ 70,400        |

| Median Household Expenses      |          |           |
|--------------------------------|----------|-----------|
|                                | Monthly  | Annual    |
| All-occupied                   | \$ 1,369 | \$ 16,428 |
| Gross rent                     | \$ 1,201 | \$ 14,412 |
| Owner-occupied                 | \$ 1,610 | \$ 19,320 |
| Housing units w/ mortgage      | \$ 1,854 | \$ 22,248 |
| Housing units w/out a mortgage | \$ 680   | \$ 8,160  |

|  |      |
|--|------|
| Avg % of Median Income Spent on Energy | 8.8% |
|--|------|



**Rental housing costs:** Contract rent, fuels, utilities.

**Owner housing costs:** Mortgage payments, property taxes, insurance, fuels, utilities, condo fees.

Households are considered "cost burdened" if they spend 30% or more of total household income on housing costs. Households spending more than this amount on housing costs may have difficulty affording basic necessities such as food, transportation, and medical care.

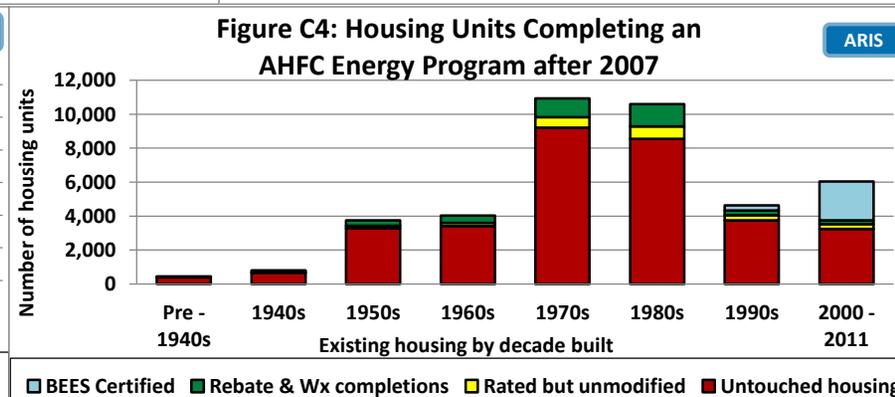
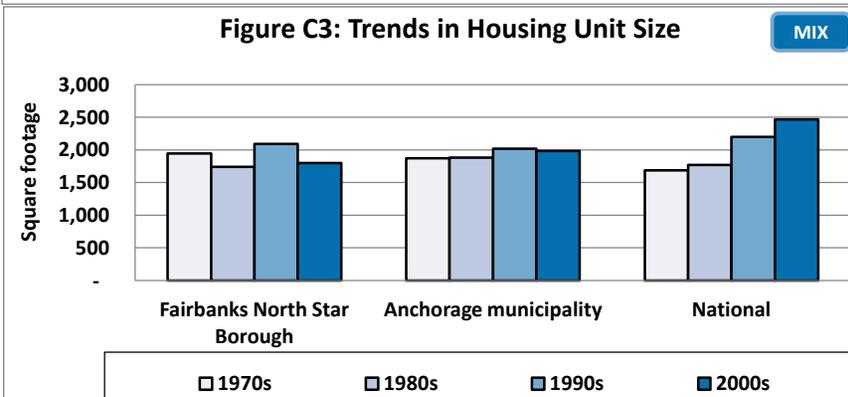
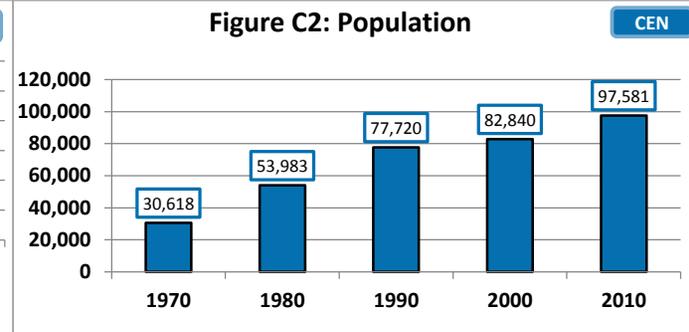
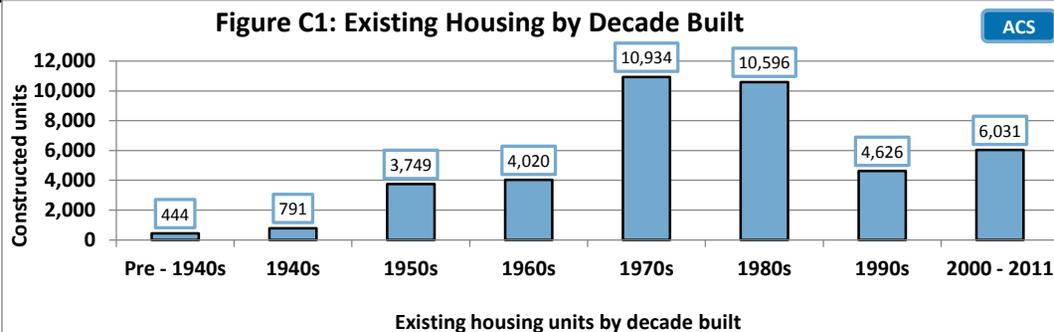
**Census Area Profile for:** Fairbanks North Star Borough

**ANCSA Region:** Doyon

**Regional Housing Authority:** Interior Regional Housing Authority

**BEES Climate Zone (Heating Degree Day Range):** Zone 8 (12,600 - 16,800 HDD)

**COMMUNITY - Fairbanks North Star Borough**



| Houses Lacking Complete Plumbing or Kitchen Facilities | Households |         |
|--|------------|---------|
|  | Number     | Percent |
| Lack complete plumbing                                 | 2,064      | 6%      |
| Lack complete kitchen                                  | 1,672      | 5%      |

|                                    |         |
|------------------------------------|---------|
| Avg Annual Energy Cost with PCE    | NO PCE  |
| Avg Annual Energy Cost without PCE | \$8,106 |

| Weatherization Retrofits (funding increased 2008) |       |
|---|-------|
| Date Range  | Units |
| 2008 - 2011                                       | 1,421 |
| 2003 - 2007                                       | 543   |
| 1990 - 2002                                       | 2276  |

| Estimated Total Annual Community Space Heating Fuel Use |            |           |
|---|------------|-----------|
| Fuel Oil  | 44,747,712 | (gallons) |
| Natural Gas   | 1,160,734  | (ccf)     |
| Electricity   | 35,946,033 | (kWh)     |
| Wood  | 27,387     | (cords)   |
| Propane   | 162,670    | (gallons) |
| Coal  | 922        | (tons)    |

| Housing Need Indicators | Number of Units | % Occupied Housing |
|-------------------------|-----------------|--------------------|
| Overcrowded             | 1,617           | 5%                 |
| Housing cost burdened   | 11,802          | 33%                |
| 1 Star Homes            | 1,577           | 4%                 |

| Housing Stock Estimates         | Number of Units |
|---------------------------------|-----------------|
| All Housing                     | 41,191          |
| All Occupied Housing            | 35,583          |
| All Vacant housing              | 5,608           |
| Vacant Housing for Sale or Rent | 2,111           |

OVERCROWDING & VENTILATION - Fairbanks North Star Borough

Figure C5: Overcrowded Units

ACS

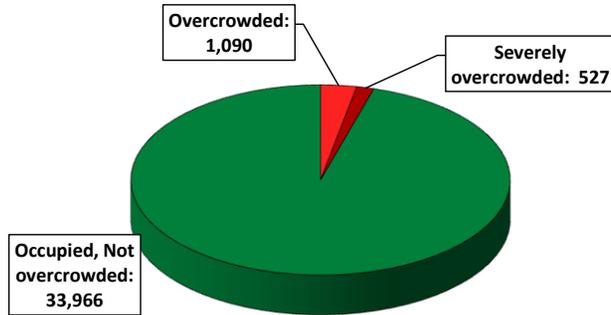


Figure C6: Housing Occupancy

MIX

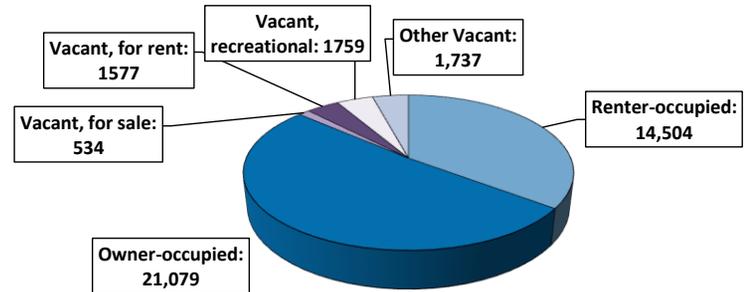


Figure C7: Average Air-Tightness of Current Homes by Decade Built

ARIS

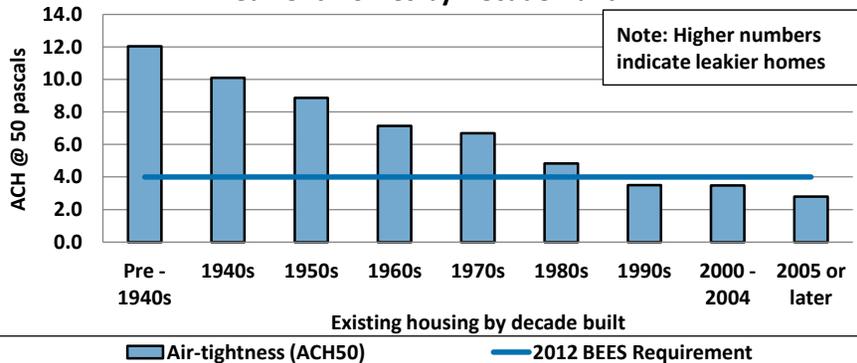


Figure C8: Existing Ventilation Type by Decade Built

ARIS

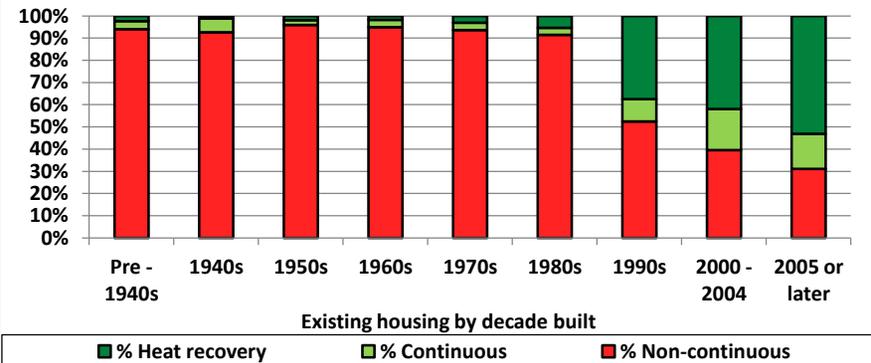


Figure C9: Percent of Housing Stock at High Risk of Moisture and Air Quality Problems

ARIS

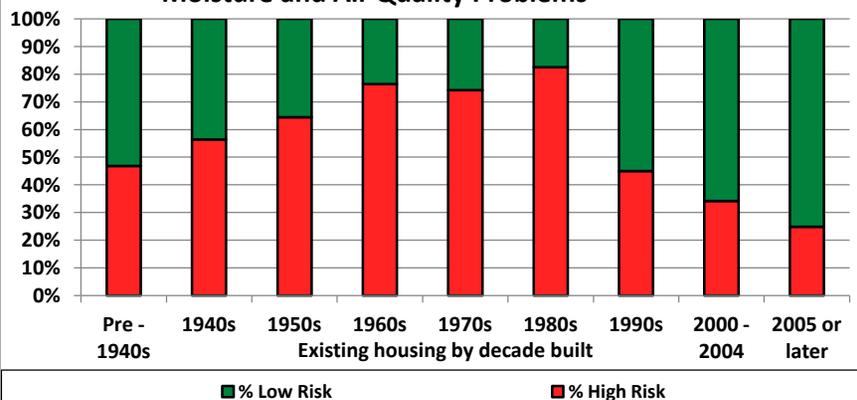
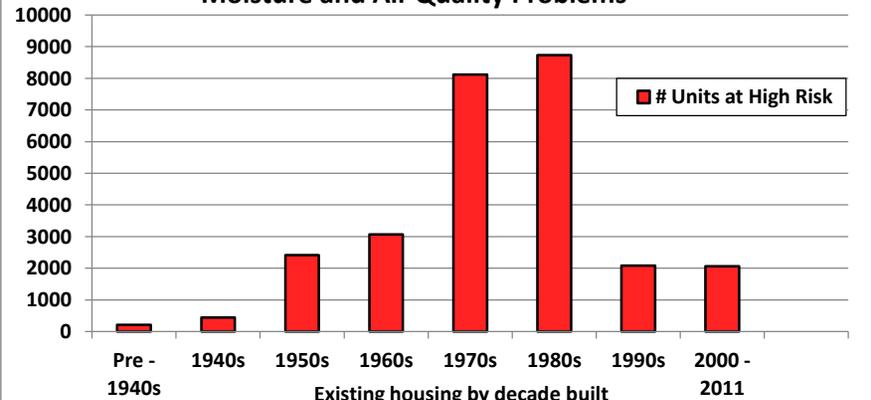


Figure C10: Quantity of Housing Stock at High Risk of Moisture and Air Quality Problems

ARIS



ENERGY - Fairbanks North Star Borough

Current Fairbanks North Star Borough Housing Energy Characteristics By Decade Built

| Current Residential Units by Year Built | # of AkWarm Records | Avg Energy Rating Stars | Avg Energy Rating Points | Avg Sq. Feet | Avg. Annual Energy Cost | Avg. Annual Energy Use (million BTUs) | Avg Ann Energy by End Use (million Btus) |     |            | Avg. EUI (kBtUs / SF) | Avg. ECI (\$ / SF) | Avg. Home Heating Index |
|---|---------------------|-------------------------|--------------------------|--------------|-------------------------|---------------------------------------|--|-----|------------|-----------------------|--------------------|-------------------------|
|   |                     |                         |                          |              |                         |                                       | Space Heating                            | DHW | Appliances |                       |                    |                         |
| OVERALL                                 | 11,073              | 3-star                  | 72.1                     | 1,844        | \$8,106                 | 247                                   | 188                                      | 26  | 31         | 143                   | \$4.76             | 7.7                     |
| Pre- 1940                               | 95                  | 2-star                  | 53.0                     | 1,846        | \$9,735                 | 301                                   | 251                                      | 20  | 30         | 182                   | \$6.03             | 10.8                    |
| 1940- 49                                | 230                 | 2-star                  | 59.7                     | 1,488        | \$7,623                 | 229                                   | 179                                      | 22  | 28         | 168                   | \$5.68             | 9.4                     |
| 1950- 59                                | 802                 | 2-star plus             | 60.4                     | 1,637        | \$8,661                 | 267                                   | 213                                      | 25  | 29         | 173                   | \$5.75             | 9.8                     |
| 1960- 69                                | 1,013               | 2-star plus             | 64.7                     | 1,836        | \$9,022                 | 281                                   | 224                                      | 27  | 30         | 161                   | \$5.26             | 9.1                     |
| 1970- 79                                | 2,839               | 2-star plus             | 67.7                     | 1,948        | \$8,995                 | 278                                   | 221                                      | 26  | 31         | 152                   | \$5.02             | 8.5                     |
| 1980- 89                                | 3,344               | 3-star plus             | 75.7                     | 1,743        | \$7,651                 | 232                                   | 176                                      | 25  | 31         | 140                   | \$4.66             | 7.4                     |
| 1990- 99                                | 1,162               | 4-star                  | 79.9                     | 2,091        | \$7,884                 | 238                                   | 167                                      | 26  | 30         | 120                   | \$4.06             | 6.2                     |
| 2000- 2004                              | 1,456               | 4-star                  | 81.9                     | 1,801        | \$6,604                 | 193                                   | 136                                      | 26  | 31         | 113                   | \$3.95             | 5.6                     |
| 2005 or later                           | 1,556               | 4-star plus             | 84.6                     | 1,848        | \$6,252                 | 181                                   | 123                                      | 26  | 33         | 104                   | \$3.65             | 5.0                     |

Figure C11: Current Average Energy Use Intensity and Average Square Footage by Decade Built

ARIS

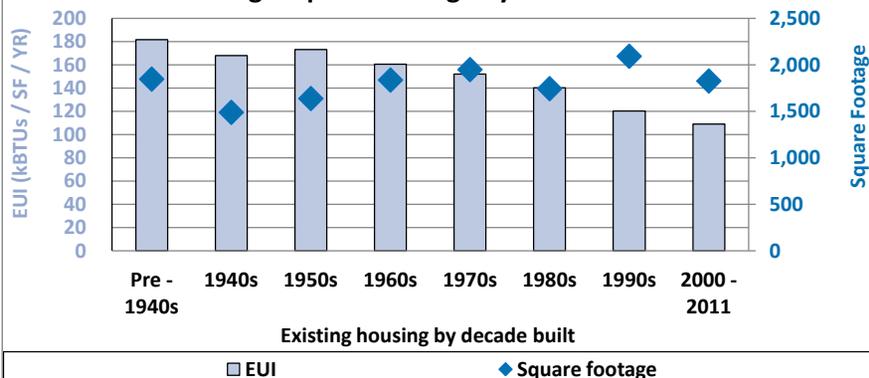
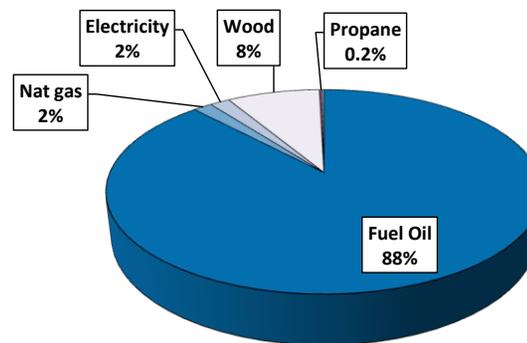


Figure C12: Percent of Total Residential Space Heating Energy by Fuel Type

ARIS



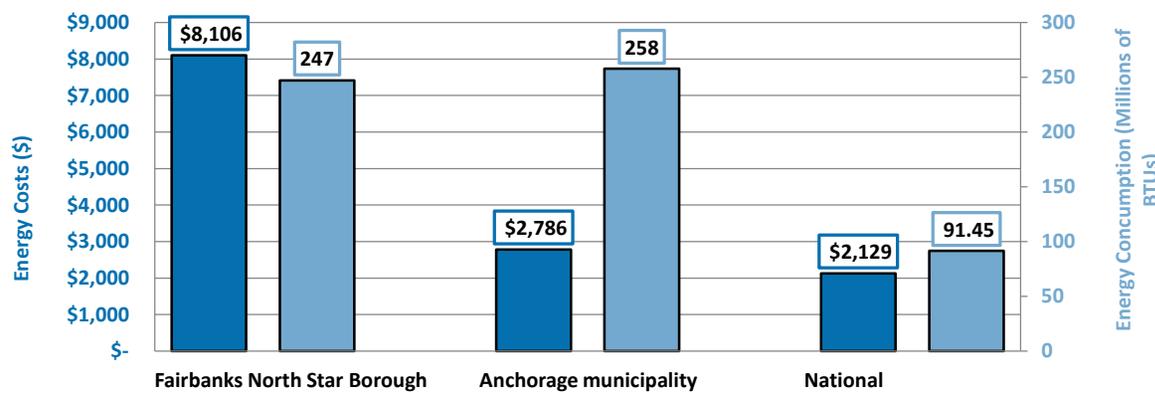
Current Fairbanks North Star Borough Housing Envelope Characteristics By Decade Built

| Current Residential Units by Year Built | # of AkWarm Records | ACH 50 | Ceiling R | Above Grade Wall R | Below Grade Wall R | Above Grade Floor R | On Grade Floor R | Below Grade Floor R | Door U | Garage Door U | Window U |
|---|---------------------|--------|-----------|--------------------|--------------------|---------------------|------------------|---------------------|--------|---------------|----------|
| OVERALL                                 | 11,073              | 5.6    | 31        | 16                 | 7                  | 25                  | 3                | 3                   | 0.31   | 0.26          | 0.47     |
| Pre- 1940                               | 95                  | 12.0   | 21        | 12                 | 3                  | 20                  | 4                | 2                   | 0.42   | 0.25          | 0.57     |
| 1940- 49                                | 230                 | 10.1   | 23        | 13                 | 4                  | 20                  | 3                | 2                   | 0.37   | 0.25          | 0.55     |
| 1950- 59                                | 802                 | 8.9    | 24        | 12                 | 3                  | 18                  | 3                | 3                   | 0.35   | 0.30          | 0.53     |
| 1960- 69                                | 1,013               | 7.1    | 26        | 13                 | 4                  | 20                  | 3                | 3                   | 0.36   | 0.31          | 0.53     |
| 1970- 79                                | 2,839               | 6.7    | 28        | 14                 | 7                  | 24                  | 3                | 3                   | 0.33   | 0.30          | 0.53     |
| 1980- 89                                | 3,344               | 4.8    | 34        | 18                 | 9                  | 25                  | 3                | 3                   | 0.29   | 0.27          | 0.44     |
| 1990- 99                                | 1,162               | 3.5    | 38        | 19                 | 12                 | 30                  | 5                | 3                   | 0.27   | 0.20          | 0.40     |
| 2000- 2004                              | 1,456               | 3.5    | 39        | 17                 | 13                 | 28                  | 5                | 3                   | 0.26   | 0.17          | 0.37     |
| 2005 or later                           | 1,556               | 2.8    | 42        | 18                 | 14                 | 34                  | 7                | 4                   | 0.24   | 0.17          | 0.31     |

|                            |     |    |    |    |    |    |    |    |      |      |      |
|----------------------------|-----|----|----|----|----|----|----|----|------|------|------|
| BEES 2009 - Climate Zone 8 | 7.0 | 38 | 30 | 15 | 38 | 15 | 15 | 15 | 0.22 | 0.22 | 0.22 |
| BEES 2012 - Climate Zone 8 | 4.0 | 48 | 30 | 15 | 38 | 15 | 15 | 15 | 0.22 | 0.22 | 0.22 |

AFFORDABILITY - Fairbanks North Star Borough

Figure C13: Average Annual Home Energy Cost and Use



| Housing Information | Avg Household Size (# of people) |
|---------------------|----------------------------------|
| All-occupied        | 2.6                              |
| Owner-occupied      | 2.7                              |
| Renter-occupied     | 2.4                              |

| Median Value of Owner-occupied House with Mortgage |
|--|
| \$221,500  |

| Median Value of Owner-occupied House without a Mortgage |
|---|
| \$185,100   |

| Median Annual Household Income |                  |
|--------------------------------|------------------|
| Housing Units                  | Household Income |
| All-occupied                   | \$ 68,922        |
| Renter-occupied                | \$ 46,898        |
| Owner-occupied                 | \$ 88,845        |
| w/ mortgage                    | \$ 93,453        |
| w/o mortgage                   | \$ 73,144        |

| Median Housing Costs           |          |           |
|--------------------------------|----------|-----------|
|                                | Monthly  | Annual    |
| All-occupied                   | \$ 1,256 | \$ 15,072 |
| Gross rent                     | \$ 1,105 | \$ 13,260 |
| Owner-occupied                 | \$ 1,445 | \$ 17,340 |
| Housing units w/ mortgage      | \$ 1,853 | \$ 22,236 |
| Housing units w/out a mortgage | \$ 571   | \$ 6,852  |

Avg % of Median Income Spent on Energy **11.8%**

Figure C14: Affordability - Housing Costs as a Percent of Income

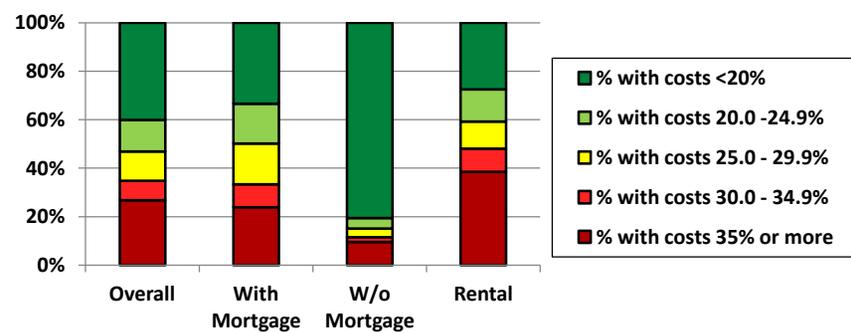


Figure C15: Number of Cost-Burdened Housing Units

