

**ALASKA DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
&
FAIRBANKS NORTH STAR BOROUGH**



**1st Annual Report
Air Quality
Control Program Implementation Status
Fairbanks North Star Borough PM_{2.5}
Nonattainment Area**

2021

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Report Purpose

The Department of Environmental Conservation (DEC) and the Fairbanks North Star Borough (FNSB) Air Quality Program published this report to provide the community and other interested parties an update on the activities and progress made to implement control programs and improve air quality within the FNSB fine particulate matter (PM_{2.5}) nonattainment area. Significant progress has been made to improve air quality over the last several years and with continued efforts by the communities, the air quality plan projects that the area will reach attainment of the PM_{2.5} National Ambient Air Quality Standard (NAAQS) in 2024.

Wood smoke is the primary cause of the PM_{2.5} exceedances within the nonattainment area. A variety of control strategies and technologies to reduce the wood smoke have been identified and included in the Moderate and Serious Area State Implementation Plans. While some of these control measures are already being implemented, others are slated to commence in later years. This report consists of some of the ongoing DEC/FNSB concerted efforts to reduce wood smoke in the FNSB nonattainment area. Some data in the report is by calendar year, such as monitoring data and programs that operate year-round, while other information is based on the November to March heating season, such as the number of alerts, when most of the exceedances are recorded and where the control measures are targeted. This is not a comprehensive detailed scientific study-level report on all efforts. It is meant to give a high-level overview of efforts primarily conducted by DEC and the FNSB. DEC and the FNSB intend to continue this Annual Air Quality Implementation Report in the coming years.

The report also contains the status of some other air quality efforts continuing in the area. Separately from this report, DEC is required to report to the Environmental Protection Agency (EPA) every three years the progress being made to reach the emission milestones in the State Implementation Plan (SIP). The formal name for this effort is the Reasonable Further Progress (RFP) report and the reporting schedule is located in the Serious SIP. The schedule for submitting RFP reports that address progress in meeting the quantitative milestones (QM) identified in the plan is below.

FNSB Reasonable Further Progress and Quantitative Milestone Analysis Years

RFP and QM Analysis Years
2017, 2020, 2023, 2026

The triennial RFP technical reports are due to the EPA by March 31 after each analysis year. The 2020 report and the 2017 report are posted on DEC's website at: <https://dec.alaska.gov/air/anpms/communities/progress-annual-reports>

Background

A portion of the Fairbanks North Star Borough, including the City of Fairbanks and the City of North Pole, was designated as a PM_{2.5} Nonattainment Area in December 2009. These areas exceed the federal health-based 24-hour PM_{2.5} NAAQS of 35 micrograms/cubic meter.

Analysis shows that local emissions from wood stoves, burning distillate oil, industrial sources, and mobile emissions directly contribute to particulate pollution. For planning purposes, PM_{2.5} is primarily a concern during the winter months (November through March) when extremely strong temperature inversions are frequent and human-caused air pollution impacts increase. Control programs such as curtailments and burn bans have been implemented during inversions to assist in reducing the wood smoke emission. Summertime wildland fire smoke is also a health concern but is considered natural and uncontrollable.

Overview

Past Winter 2020/21 (November through March 31, 2021)/Calendar Year - 2020.

Highlights from the past winter/year:

Effective Dates:

- January 8, 2020 was the effective date of most of the state regulations developed for the Serious SIP.
- September 1, 2020 was the effective date for an additional emission criterion for new wood-fired heaters that relies on data from the 1-hr measurement in federal certification tests. In order to get EPA certified, a wood-fired heating device's emissions must be measured and recorded after 1 hour of testing. For a new device in the nonattainment area, its test may not exceed 6 g/hr for its 1-hr measurement. The devices that could not meet this threshold were removed on September 1, 2020 from the DEC Approved List for new devices. Only new devices on this list may be installed in the nonattainment area. To determine if a device met the criteria, DEC staff reviewed the certification test reports and found a number of issues. Additional information is provided later in the report under the "New Wood Fired Heating Device Emission Standards" section.
- October 2, 2020 was the effective date requiring all wood-fired heating devices older than 25 years to be removed or replaced by either 2024 or when sold as part of a real estate transaction, whichever is soonest. There is one exception, and that is if the device is emission rated at 2.0 g/hr or less. This measure was triggered when EPA's notice of Failure to Attain the NAAQS by the Clean Air Act due date of December 31, 2019 became effective.
- December 2020, DEC submitted an amendment to the FNSB PM_{2.5} Serious SIP to the EPA. The amendment incorporated the latest monitoring data, set a new base year, and where applicable updated the technical analyses. This amendment did not add any new regulations beyond establishing a new contingency measure which will be triggered in the future if the area fails to meet one of four requirements. The four triggering conditions are found in 18 AAC 50.030(c).

Achievements

- DEC/FNSB were awarded a new EPA Targeted Air Shed Grant (TAG), bringing an additional \$14.7 million to assist in meeting air quality goals. Additional information is provided later in the report under the Targeted Air Shed Grant section.
- DEC provided the public with the ability to register solid fuel heating devices online and expanded the ability for residents to apply for Stage 1 and No Other Adequate Source of Heat (NOASH) curtailment waivers online.
- DEC rolled out a new, more cost effective, method for sending texts regarding air advisories or alerts within the nonattainment area and statewide.
- In late 2019 the FNSB Assembly appropriated \$1.0 million for an oil to gas conversion program. The new program launched in 2020 within the FNSB change out program.
- In 2020 the FNSB change out program completed 264 change outs.
- DEC received permit applications from all five of the affected local industrial facilities in accordance with the requirements in the Serious SIP. One permit has been issued. A couple of facilities have had their draft permit developed and completed the required public comment

period or are close to being released for public comment. DEC is on track to issue the permits by the June deadline identified in the Serious SIP. The industrial facilities have been working diligently to meet their SIP Best Available Control Technology (BACT) requirements. Those individual efforts are not detailed in this report.

- DEC made progress on its efforts to update its analytical models for use in future SIP development. Additional information is provided later in the report under the “Planning Update Model” section.
- DEC/FNSB completed a testing program for retrofit control devices. A retrofit catalyst and electrostatic precipitator (ESP) were tested on a pellet stove, and the ESP was tested on a cordwood stove. Results of the testing program showed that current ESP technology is not appropriate for use in the FNSB on cordwood stoves. Program findings can be found online at: <https://www.fnsb.gov/445/Retrofit-Control-Device-Testing>

Next Winter 2021/22 /Calendar Year 2021

The following items are expected to be completed or worked on over the course of the next year and will be reported in the 2nd annual report.

- DEC/FNSB will apply for another TAG from the EPA and will continue implementation of work under the existing TAG awards.
- DEC will continue to implement control programs identified in the SIP.
- FNSB will continue to implement the woodstove change out and conversion program.
- Starting October 1, 2021, only dry wood may be solid within the nonattainment area. There is an exception for 8-foot rounds, but requirements must be met in order for the exception to apply. See DEC regulations at 18 AAC 50.076(j).

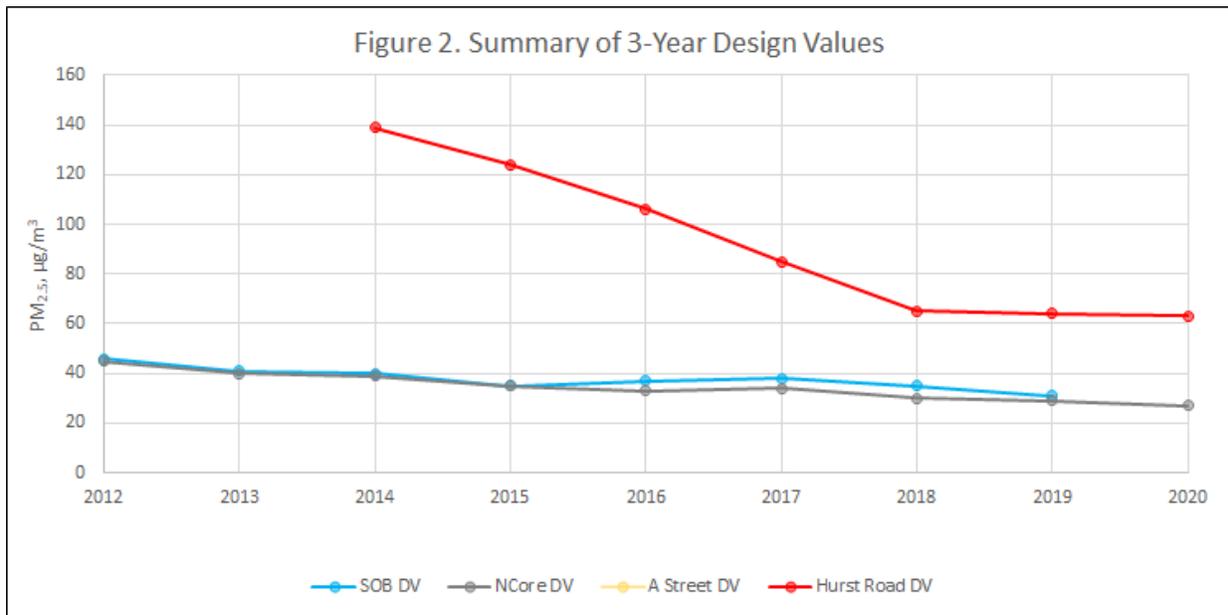
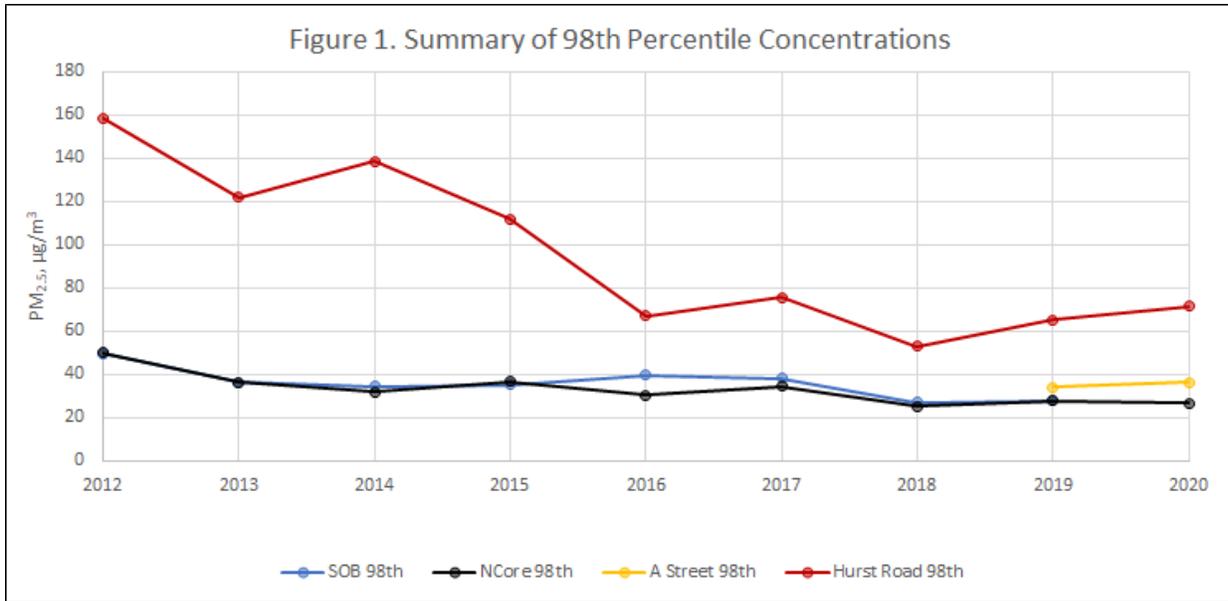
Design Value Update

The EPA sets air quality standards for air pollutants, and the goal for a community is to remain below the limit set in the standard. The 24-hour PM_{2.5} NAAQS is set at 35 µg/m³. A community attains the 24-hour standard when the 98th percentile of 24-hour PM_{2.5} concentrations for each year, averaged over three years, is less than or equal to 35 µg/m³. This three-year average is called the design value. The 98th percentile value depends on the number of valid monitored days in a year and is typically the 8th highest monitored value at a site within a calendar year. Table 1 below summarizes the 98th percentile concentrations and the design values for previous years. Data for 2020 have not yet been fully validated and certified by DEC and EPA, therefore the data reported for 2020 are still considered preliminary. DEC is scheduled to certify the 2020 data by May 1, 2021.

Table 1. Summary of the 98th Percentile and Design Value Concentrations

YEAR	2012	2013	2014	2015	2016	2017	2018	2019	2020 (Prelim)
State Office Building 98th %tile (site discontinued in 2019)	49.6	36.3	34.5	35.3	39.7	38	27	27.7	N/A
State Office Building Design Value	46	41	40	35	37	38	35	31	--
NCore 98th %tile	50	36.2	31.6	36.7	30.3	34.4	25.3	27.7	26.6
NCore Design Value	45	40	39	35	33	34	30	29	27
A Street 98th %tile								34.1	36.1
A Street Design Value									
Hurst Road 98th %tile	158	122	139	112	66.8	75.5	52.8	65	71.4
Hurst Road Design Value			139	124	106	85	65	64	63

The preliminary 2020 data shows a decline of the design values for the Fairbanks NCore and the North Pole Hurst Road monitoring sites although there appears to be a slight increase in the 98% percentile for the monitoring sites at Hurst Road and A Street. The State Office Building monitoring site was shut down in mid-2019 and moved to the A-Street site. No 2020 design values were calculated for either site due to insufficient data. Figures 1 and 2 show the annual trends in the 98th percentile concentrations and the design values for each air monitoring site.



Targeted Airshed Grants (TAG)

EPA Targeted Air Shed Grants (TAG) are available to those communities that are one of the top 5 worst in the nation for either Ozone, large Particulate Matter (PM10), or small Particulate Matter (PM2.5). The total TAG amount is determined by Congress. EPA determines eligibility based on a community’s rolling three-year average design value that is calculated based on monitored values.

If eligible, a community is allowed to submit applications. Each application is then evaluated against the grant criteria and assigned points. The scores from all applications are ranked, with the applications

scoring the highest most likely to be awarded their requested application amount. All eligible communities are competing against each other regardless of the pollutant type that made them eligible.

There are a wide range of requirements associated with the TAG program. Currently DEC is the only entity in Alaska that may apply for the TAG. However, DEC works in partnership with the FNSB and the Department of Commerce and Community Economic Development (DCCED) to develop applications and implement awards. DEC's Division of Air Quality does not have authority to issue grants, therefore TAG funding allocated in the grant work plan for the FNSB is passed from DEC to DCCED who subawards the funding to FNSB. DCCED is allocated a portion of the TAG to cover grant administration costs.

Table 2 illustrates the four TAG grants received by DEC, the amount received, and the main focus of the workplan for which the grant was awarded.

Table 2. Targeted Airshed Grant Funding, Workplan Focus, and Amount

TAG Year	Workplan Focus	Funding Amount
FY-16	Wood stove change outs	\$2,477,250
FY-17	Wood stove change out to Oil/Gas/Propane	\$4,000,000
FY-18	Wood stove change out to Oil/Gas/Propane + education funding	\$5,000,000
FY-19/20	Wood-to-Wood & Wood to Liquid + NOASH reduction project, a bounty program, additional supplemental enforcement staff for DEC and funding for highway signs.	\$14,717,265
Total		26,194,515

Control Program Implementation

Although there are a number of pollution reduction measures contained in both the Moderate SIP and the Serious SIP, this document focuses on the following solid fuel heating measures:

- Public Education/Outreach
 - FNSB Outreach
 - DEC Outreach
 - Highway Signs (CMAQ/TAG)
- Woodstove Change out/Conversion
- Solid-Fuel Burning Curtailment
 - Alerts Called
 - Waivers
 - Compliance and Enforcement
- Wood-Fired Heating Device Registration
- Commercial Wood Sellers
- New Wood Fired Heating Device Emission Standards
 - DEC – Approved Device Lists

Public Education/Outreach

Public education/outreach efforts are conducted by both DEC and FNSB Air Program staff, with each agency focusing on the programs they manage. FNSB has promoted support for the change out and conversion programs and general air quality messaging. DEC outreach has focused on the programs DEC is responsible for implementing; waivers, device registration, curtailments, alerts, wood fired heating device standards, wood heater requirements during real estate transactions, etc.

FNSB Outreach

FNSB education/outreach efforts typically include face to face events to connect with the community. However due to the pandemic these types of outreach activities were not conducted in 2020. Past outreach examples included trade show booths, public events, and cooperative extension classes.

FNSB completed the following activities in 2020:

- Worked with a public relations firm to create a series of three new ads featuring a Yeti as the main character. These ads were used in TV, radio, and online advertising to help further promote the Borough's Change Out Programs. A total of 4,776 radio ads and 4,324 television ads were played over the course of the year.
- FNSB's Air Quality website was redesigned and went live in November 2020. The website is now easier for the public to use, including a mobile phone friendly format.
- FNSB Air Quality staff continued the moisture meter loan program, where members of the public may borrow a moisture meter to test their firewood's moisture content.
- Participants in the Change Out program that were able to switch to a new wood stove were required to complete Burn Wise training, along with training by the installer of the new appliance. This training was to ensure they understand how to use their new appliance, as well as the importance of burning only dry wood.
- The health-based Air Quality 3-day forecast was updated daily on the Borough's website: AQFairbanks.com.

DEC Outreach

While FNSB implements general air quality information outreach, DEC works with others within the community beyond the general public to implement regulations and programs. DEC organizes outreach programs to educate and assist real estate professionals, vendors in the Fairbanks nonattainment area, and commercial wood sellers (see separate section for details). Outreach is increased when new regulations are to be implemented to ensure that affected individuals and businesses are aware of the new requirements. Table 3 provides examples of the outreach completed in the last two years.

Table 3. Control Measure Stakeholder Outreach

Types of outreach for control measure support	2019	2020
Number of outreach/informational letters sent to real-estate professionals	1	1
Solid fuel heating device vendor letters or communications	1	4
Presentations, Q&A sessions to real-estate professionals, vendors etc.	10	2
Average weekly real-estate contacts received by DEC	Not tracked	1
Updated DEC Approved device list (prior to 2020, DEC maintained an EPA certified list on its website)	Monthly or When necessary	Monthly or When necessary
Number of real-estate investigations for noncompliance	0	1
Regular contact with solid fuel device vendors	Bimonthly	Bimonthly

Due to the COVID pandemic in 2020, physical letters were not mailed out as they were in 2019, and presentations were virtual. All 2020 letters were transmitted via email to an electronic address list of those in the target business sector, which includes hundreds of individuals or companies. Each number in the 2020 column represents the number of times a letter was sent to an electronic address list. Real-estate professionals and other affected vendors are encouraged to contact DEC to be added to the list. However, DEC also posts all formal letters and other relevant information to its real estate requirement webpage <https://dec.alaska.gov/air//anpms/communities/fbks-pm2-5-real-estate/> and solid fuel heating device standards and requirements web page <https://dec.alaska.gov/air/burnwise/standards/>.

DEC conducted several social media outreach efforts in 2020. DEC posts air quality alerts on @AlaskaDEC on Facebook and Twitter. On Facebook, air quality alerts had an average reach of 787, with a high reach of 5,140. On Twitter, air quality alerts averaged 652 impressions, with a high of 2,243. During the period when alerts were issued, DEC's Facebook page averaged 5,157 followers and the Twitter account averaged 5,261. Individuals can follow DEC on twitter @AlaskaDEC or on Facebook at Alaska Department of Environmental Conservation.

Social media outreach regarding new waiver application requirements was conducted twice; in the spring to encourage waiver holders to review new requirements and plan accordingly and then again in the fall to remind residents waiver applications were available with new requirements. DEC also posted a survey designed to assist in developing the Burn Right Program and social media was used to encourage participation in the survey. The survey ran for six weeks, was viewed 3,840 times, and was completed by 94 individuals.

Highway Signs

During the local stakeholder process, the use of highway signs to announce alerts was identified as an unmet need for the area. To assist with this outreach, DEC submitted applications for two projects that are now underway to install dynamic highway messaging signs. The Department of Transportation (DOT) will install three highway signs at the Priority 1-3 locations on the map shown in Figure 3. In the winter months these signs will be used to alert thousands of commuters driving on major highway corridors to air quality alerts, advisories, and curtailments.

It is hoped that procurement and installation of the signs will be completed by the summer of 2022. One sign is funded with Congestion Mitigation and Air Quality (CMAQ) funds through the metropolitan planning organization, FAST Planning (see FAST Planning section for more details). The two other signs are funded with the 2019/20 TAG.

Figure 3. Priority Locations of Highway Signs



In addition to the highway signs, the 2019/20 TAG will also provide additional funds for increasing awareness and outreach regarding curtailments and alerts. One project this funding will be used for is an enhanced curtailment and alert campaign developed in the summer of 2021 and implemented during the winter of 2021/2022.

Woodstove Changeout/Conversion Program

The Wood Stove Change Out (WSCO) program, is a control measure under the Moderate Area SIP and Serious Area SIP. The WSCO program administered by the FNSB Air Quality Program is reinforced with funds from the EPA's TAG. The program's aim is to upgrade or remove solid fuel-fired heating devices to provide immediate and long-term reductions of PM_{2.5} emissions in the nonattainment area.

Since 2010, the change out program has evolved to ensure the best emission outcomes by narrowing who is eligible, and what types of devices may be changed out and installed.

Currently, DEC has been awarded and oversees four TAGs, passing these funds through to the FNSB for the change out program. FNSB also had \$1 million in funding appropriated by the FNSB Assembly in late 2019, with program launch in 2020, to support natural gas expansion through conversion of residential oil heating appliances to gas heating appliances. Funding amounts are shown in Figures 4-6 below. Figures 4-5 include a Supplemental Environmental Project (SEP), which is a voluntary agreement between an entity with alleged environmental violations and the regulatory agency with delegated authority to enforce environmental regulations. In a SEP the entity with alleged environmental violations voluntarily agrees to undertake an environmental project as the result of a settlement agreement. SEPs were funded by Golden Valley Electric Association, Doyon Utilities, LLC, and University of Alaska Fairbanks.

Figure 4. Total Program Funding by Source

Figure 5. Total Program Expenditure by Source

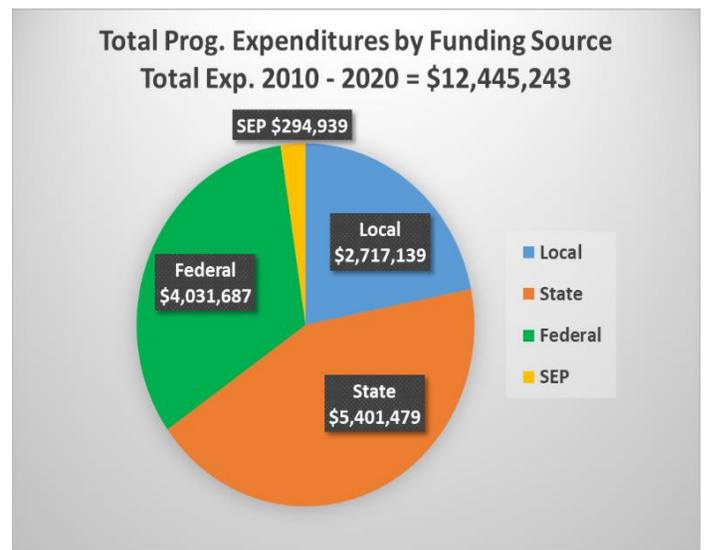
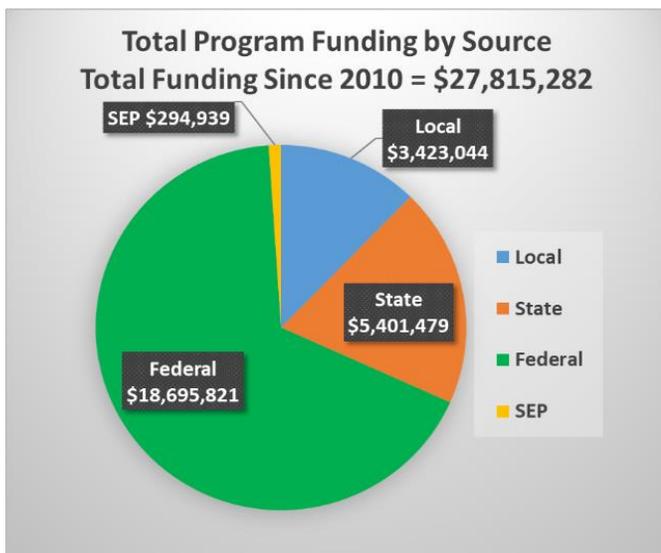


Figure 6. Funding Balance

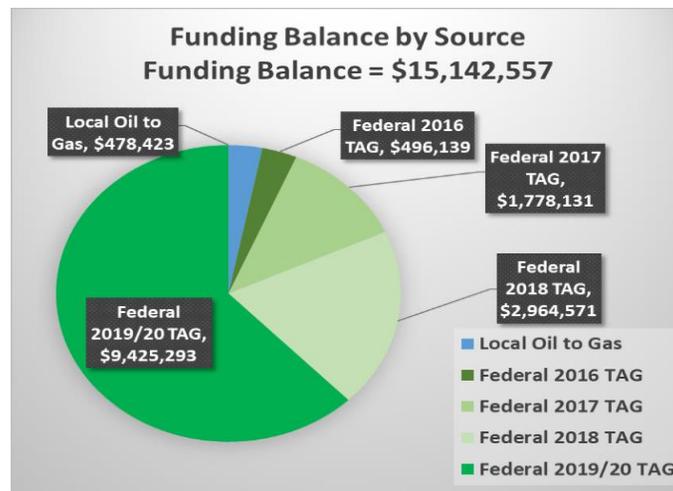


Figure 7 displays the total wood stove change outs from 2010 to 2020, while Figure 8 shows change outs by device replacement type over all the years that a change out program has been in place.

Figure 7. Total Change Outs by Year 2010 - 2020

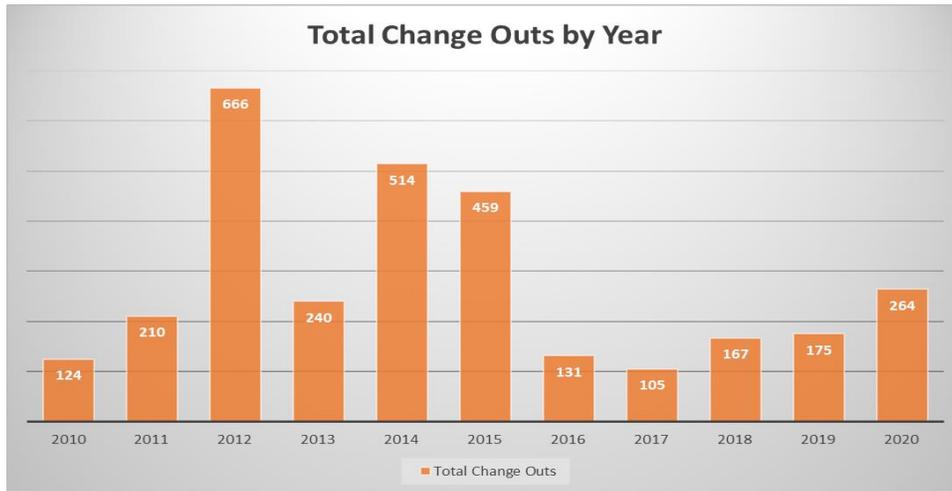
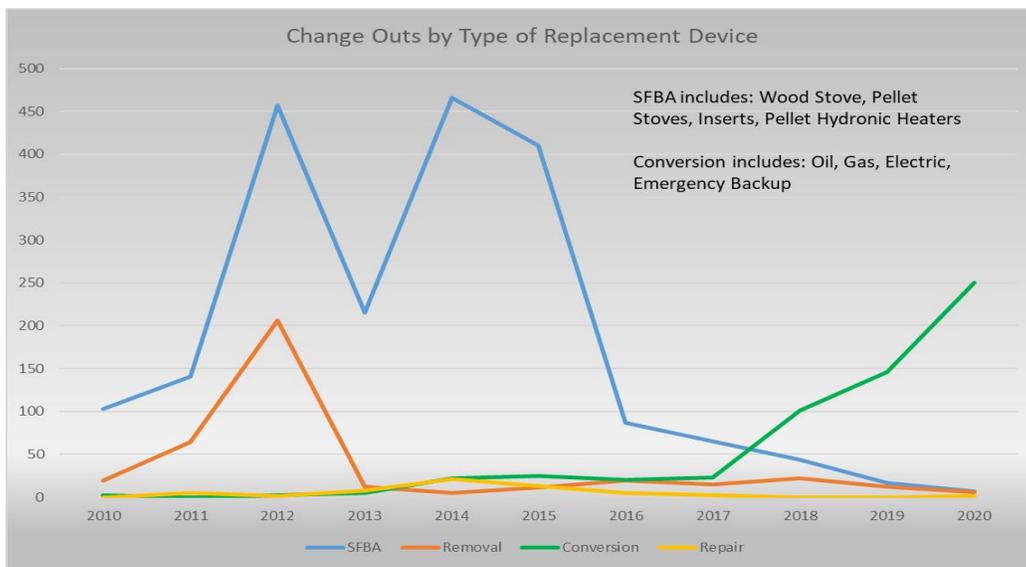


Figure 8. Change Outs by Type of Replacement Device



Emissions from wood stoves are dependent on device, clean dry fuel, professional installation, and proper operation. The WSCO program can address device and professional installation however the emission reductions are still dependent on the expertise and willingness of each homeowner to burn clean dry fuel and operate the stove per manufacturer’s instructions. While the WSCO program includes educational materials, DEC and the FNSB also acknowledge that to ensure emission reductions a large-scale behavioral change needs to be accomplished, which is inherently difficult. With those difficulties in mind the program focus has been shifting towards appliances such as oil and gas that do not depend

on large scale behavioral changes to achieve emission reductions. In Figure 8, a decrease in Solid Fuel Burning Appliance (SFBA) installations with a corresponding increase in conversions to non-SFBA options can be seen beginning in 2017. The shift away from installing new SFBAs with public funding has been accelerated by the focus on conversions to non-SFBA options within the 2017 TAG, 2018 TAG, and the local funding provided through the Oil to Gas program. FNSB’s program has bolstered the shift away from installing new SFBAs by promoting conversions through higher incentive levels, higher priority scoring of applications, and personal interactions at the staff level explaining the benefits of converting to a cleaner appliance.

Solid-Fuel Burning Curtailment

Curtailment continues to be the most effective measure for reducing emissions during winter inversion episodes. DEC issues air quality advisories or alerts when the measured pollution exceeds the thresholds identified in the air quality plan. The levels that trigger an air quality advisory or alert are found in Table 4 and Table 5 below. DEC notifies the public about air quality alerts, episodes, and exemptions through outreach methods including social media, TV, radio, electronic notification (email/text), alert phone line, and the DEC Curtailment and Alerts for FNSB nonattainment area web page at: <http://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-curtail-alert/>. To sign up for electronic notifications individuals may go to: Airalertstext.org

A curtailment announcement might include area exemptions for experiencing power outages and residents who have temporary waivers. Exceptions to individual episodes may also be based on the class or type of device or on a device’s particulate emission rate.

Table 4. FNSB Nonattainment Area PM2.5 Advisory Alert Level

Type	24-hour Average PM2.5 Concentration (µg/m ³)
Advisory Alert	15

Table 5. FNSB Nonattainment Area PM2.5 Air Quality Episode Thresholds and Exceptions

Episode Feature	Stage 1 Air Alert	Stage 2 Air Alert
PM2.5 Threshold in micrograms per cubic meter (µg/m ³)	20	30
Exceptions During a Power Outage	Yes	Yes

Table 6. Number of Stage restrictions/curtailments called by DEC during the heating seasons

Heating Seasons (November - March)	North Pole				Fairbanks			
	Stage 1	Days	Stage 2	Days	Stage 1	Days	Stage 2	Days
2018/2019	13	23.5	23	30.1	14	20.7	1	2
2019/2020	7	6.8	24	28.4	19	18.2	9	15.6
2020/2021	15	12	32	46	30	33.8	15	20.7

DEC has included the number of days in order to give context to the number of alerts issued as some alerts are active for more than a single 24-hour period. The total number of days is calculated from the total number of active hours, which is what DEC tracks. For example, the shortest alert issued has been 12 hrs and the longest alert has been 96 hours or 4 days.

There are times when the use of a wood fired heating device is allowed during curtailment, but only with a waiver. A waiver may be granted by DEC if the applicant meets specified requirements.

There are two types of waivers: No Other Adequate Source of Heat (NOASH) and Stage 1. NOASH waivers allow waiver holders to burn during all curtailments. Stage 1 waivers allow waiver holders to burn during a Stage 1 Alert only. Waivers have a set expiration date when they are issued and require proof of proper installation, maintenance (chimney sweeping), the device meets age restrictions, and proof of the use of dry wood in the form of proper wood storage.

Table 7. Burn restriction waivers issued by DEC during the heating seasons

Heating Seasons (November - March)	DEC NOASH Waivers Issued	DEC Stage I Waivers Issued	Total
2018/2019	27	0*	27
2019/2020	48	26	74
2020/2021	17	24	41

* DEC honored the FNSB issued Stage 1 waivers for the 2018/2019 season

The 2018/2019 season was the first season that DEC issued burn restriction waivers. In October 2018 the administration of the program changed from the FNSB to DEC due to the passage of a local ballot initiative (Proposition 4) which restricted Borough authority over air quality compliance. For that first winter, as indicated in Table 7, DEC only issued NOASH waivers and honored all FNSB issued Stage 1 waivers (*). All 2018/2019 waivers expired on April 1, 2019 after which DEC implemented a full waiver program issuing both Stage 1 and NOASH waivers.

Compliance and Enforcement

Prior to the winter of 2018/2019, the FNSB was responsible for compliance and enforcement of curtailments and DEC provided supplemental staffing resources to FNSB's effort. With the passage of proposition 4 in October 2018, FNSB was prohibited from regulating home heating and the responsibility of compliance and enforcement for curtailments was transferred to DEC. As a result of proposition 4, FNSB cut 5 air quality positions reducing the capacity available for compliance and enforcement. Compliance and enforcement of curtailments are triggered upon the effective time and date of an Air Quality Alert that is issued by DEC's meteorologist after consulting weather forecasting models. The additional compliance and enforcement efforts, following proposition 4, were absorbed into the workload of existing DEC staff and resources of the Air Quality Division. Tables 8 and 9 provide information on DEC's curtailment compliance efforts.

Table 8. Number of Stage violations and advisory/compliance written by DEC during the 2020/2021 heating season

Violations of Alert Restrictions/Compliance Letter Sent	
Potential Observed Violations:	80
Advisory/Compliance Letters Sent:	65

Table 9. Curtailment Statistics for Heating Seasons 2018 to 2021

Heating Seasons (November – March)	Potential Observed Violations	Compliance Letters Issued	Advisory Letters Issued	Stage 1 Letters Issued	Stage 2 Letters Issued	Notice of Violation (NOV)
2018/2019	232	15	197	30	161	0
2019/2020	86	14	84	36	43	0
2020/2021	80	16	49	24	44	3

DEC's approach to compliance was to focus on information and advisory notifications when first contacting homeowners during the transition period from the FNSB program to the DEC program. 2018/2019 saw a moderate amount of extended duration inversion events requiring curtailments. DEC encountered some scheduling challenges in deploying field staff to conduct surveillance during shorter duration events.

The 2019/2020 season had an abnormally wet and snowy fall that resulted in shorter inversion events or the cancellation of alerts compared to the prior year. As a result, there were fewer longer duration events providing fewer opportunities for observations of non-compliance compared to the prior year.

In 2020/2021, social distancing policies due to the COVID pandemic resulted in solo observations, which is less efficient than the program's usual procedure because of staff time needed to record observation notes while not simultaneously operating a motor vehicle. While not as extreme as 2019/2020, warmer and wetter weather caused some deployment logistic issues. The reduced efficiencies in observation and response resulted in fewer observed violations than 2018/2019 and comparable results to 2020/2021. As noted above, DEC's approach is to focus on notification and

information when approaching violators for the first time. However, DEC has noted repeat violators over the years that have not responded to the informational approach. As DEC tracks these repeat violators, the frequency with which DEC will apply advanced enforcement responses is expected to increase, as seen by the first issuances of formal Notices of Violation in 2020/2021.

In 2021/2022, three supplemental seasonal staff will be added with funding from the 2019/20 TAG. They will support additional expanded observations as well as help conduct compliance rate surveys. They will be given different work schedules to help overcome some of the logistical issues encountered in previous years. The additional supplemental staff will be funded for five winter seasons.

Wood-fired Heating Device Registration

One of the requirements of the Serious Area SIP is the registration of wood-fired heating devices. Registration was also one of the strongly supported recommendations that came out of the 2019 local stakeholder process. Effective January 8, 2020, 18 AAC 50.077(h) required the registration of wood-fired heating devices under the following circumstances:

- Upon the sale or conveyance of a wood-fired heating device;
- Before closing, if the wood-fired heating device is being sold, leased, or conveyed as part of an existing building or other property;
- When applying for a burn restriction waiver;
- To participate in the Burn Right Program;
- To participate in any wood-stove change out or conversion programs; and
- Before closeout of any compliance or enforcement action.

Presented in Tables 10 and 11 are the current registration statistics through the end of March 2021.

Table 10. Number of Registered Wood-Fired Heating Devices

Wood-Fired Heating Devices	Registered by Calendar Year				Total
	Unknown	2019	2020	2021 (As of March 31)	
Cook Stove	0	0	3	0	3
Forced Air Furnace	0	0	3	0	3
Masonry Heater	0	0	5	1	6
Multi-Fuel Device	0	0	0	1	1
Wood Hydronic Heater	0	0	1	0	1
Pellet Hydronic Heater	3	0	0	1	4
Fireplace Insert	2	0	6	4	12
Pellet Stove	9	0	33	29	71
Wood Stove	59	1	96	55	211
Total	73	1	147	91	312

Table 11. Type of Registrations

Reason For Registering	Registered by Calendar Year				Total
	Unknown	2019	2020	2021 (As of March 31)	
Burn Wise Program	0	0	7	1	10
Compliance Close Out	0	0	8	4	12
New Device	0	0	19	67*	86
Real Estate Transaction	0	0	45	4	49
Voluntary	0	0	27	8	35
Waiver	0	1	34	5	40**
Unknown	73	0	7	0	80
Total	73	1	147	91	312

*Several new device registration paperwork was delayed in being submitted to DEC, as a result some 2020 sales were entered into the database in 2021.

**Total number of waivers is less than the number of waivers from the waiver chart, the missing waiver is likely one of the 'unknown' reasons for registering.

DEC developed an online registration form for the general public, vendors, and real estate professionals. In addition to online registration, DEC accepts paper registrations received by mail or email, which are then hand-entered into the database by DEC staff. Some new device registrations shown as registered in 2021 were actually sold in 2020. The delay in submitting the forms to DEC for data entry was expressed as concerns regarding COVID by various local wood stove vendors.

The unknown registrations and registration types in Tables 10 and 11 are for two reasons related to DEC's implementation of the new requirement. First, some registrations occurred before the addition of a required 'reason' in the database. Second, modifications to the registration process made data entry fields mandatory, until then some registrations could occur without filling in the 'reason.' Also, a flaw in the software failed to capture some of the registration dates. Over the last 9 months these problems were addressed in software updates.

Commercial Wood Sellers Program

The registration of commercial wood sellers and moisture content disclosure to wood buyers was implemented as a voluntary measure under the Moderate Area SIP in 2014. However, the program became mandatory in 2017 after the program was triggered as the Moderate Area SIP contingency measure.

The program requires that commercial wood sellers provide a form to their customers that either documents that the wood is wet or provides the measured moisture content of the wood. DEC receives a copy of the form which allows DEC to track the amount of wood sold in the area, year-round. Table 12 illustrates the information collected since 2014 on the forms submitted by registered commercial wood sellers. Beginning October 1, 2021, the DEC regulations in 18 AAC 50.076 under the Serious Area SIP will require the sale of only dry wood in the FNSB nonattainment area. The documentation to

buyers and DEC will no longer be required, however, commercial wood sellers will be required to maintain records that their wood is dry in order to document compliance.

As of March 2021, as shown in Table 13, there are 16 registered wood sellers in the Fairbanks nonattainment area with two dry wood sellers. While larger wood sellers are visited once per month by DEC staff, smaller operators are visited less frequently.

Table 12. Annual Statistics of Registered Wood Sellers (As of March 2021)

Program Elements	Voluntary Program (2014-2016) # Per Calendar Year			Mandatory Registration Program (2017 to date) # Per Calendar Year				
	2014	2015	2016	2017	2018	2019	2020	2021 (Thru March 31 st)
Number of cords tracked	249.42	1107	806	2113	2788	2657	924	58.53
Average number of tracked cords sold per month	21	92.25	67	176	232	221	77	19

Table 13. Running Total of Statistics for Registered Wood Sellers (As of March 2021)

Number of registered wood sellers	16
Number of cords tracked to date	10702

The number of registered wood sellers varies from year to year. The most that have been active at any one point in time is 21; over time, 28 different businesses have been registered. Wood sellers are able to register online and then are activated by DEC staff. A list of all the active registered wood sellers may be found at this site: <https://dec.alaska.gov/Applications/Air/airtoolsweb/WoodMoistureProgram/>

New Wood Fired Heating Device Emission Standards (Device Requirements)

As mentioned previously, wood smoke is the primary cause of the PM2.5 exceedances within the nonattainment area. The current requirements for solid fuel-fired heating devices found in Table 14 include particulate matter emission standards for new devices, installation requirements, and removal requirements.

Table 14. Current Requirements for Solid Fuel-Fired Devices

HEATING DEVICE TYPE	PARTICULATE MATTER EMISSION STANDARDS FOR NEW DEVICES	INSTALLATION REQUIREMENTS	REMOVAL REQUIREMENT
Wood-Fired Hydronic Heaters < 350,000 Btu/hr	New hydronic heaters may not be sold or installed in the Nonattainment Area.	Prohibited	Existing devices removed and rendered inoperable by 12/31/2024 or upon conveyance as part of a real estate transaction, whichever is earlier and rendered inoperable
Pellet Fueled Hydronic Heaters < 350,000 Btu/hr	EPA certified AND 0.10 lbs. per million Btu of heat output for each individual burn rate. (DEC listed)	Professionally Installed	Non-EPA certified devices must be removed or replaced by 12/31/2024 or upon conveyance as part of a real estate transaction, whichever is earlier and rendered inoperable.
		May not be installed within 330 feet from closest property line or 660 feet from a school, clinic, hospital, or senior housing unit.	
Woodstoves and Pellet Stoves < 350,000 Btu/hr	EPA certified AND 2.0 grams per hour (DEC listed)	Professionally Installed	Non-EPA certified devices must be removed or replaced by 12/31/2024 or upon conveyance as part of a real estate transaction, whichever is earlier and rendered inoperable.
	AND not exceed 6.0 grams per hour any valid 1-hr filter pull OR TEOM data indicates that no rolling 60-minute period exceeds 4.0 grams per hour. (DEC listed)		
			EPA certified devices, greater than 2.0 grams per hour AND 25 years or older must be removed or replaced by 12/31/2024 or upon conveyance as part of a real estate transaction, whichever is earlier and rendered inoperable. For devices manufactured less than 25 years before the effective date of the finding, then removal is required when device is 25 years old and rendered inoperable.
Coal-Fired Heating Devices	New coal fired heaters may not be sold or installed in the Nonattainment Area.	Prohibited	Not applicable
Wood-Fired Heating Devices > 350,000 Btu/hr	0.10 lbs. per million Btu of heat output for each individual burn rate	Professionally Installed	Not applicable

DEC-Approved Device Lists

All new heating devices eligible for installation are found on DEC-approved lists. Development of the DEC-approved lists are a multi-step process:

- 1) The device must appear on the EPA list of certified devices
- 2) DEC reviews certification test reports
- 3) DEC applies the state requirements for emission rating and 1-hr data
- 4) DEC updates the device lists as appropriate and publishes the lists at least once a month as necessary

Because of the length of time it takes staff to review certification test reports, moving forward DEC will only review test reports when a request is made by a manufacturer or retailer. At this time, only the manufacturers wishing to sell devices within the nonattainment area are requesting review and approval to be placed on DEC’s list.

After reviewing the certification test reports, DEC found a number of concerning items. In conjunction with a regional state air quality organization, Northeast States for Coordinated Air Use Management (NESCAUM), DEC reviewed the certification test reports for 131 cordwood and 96 pellet stoves all of which were listed on EPA’s list of certified residential wood heaters devices. The review process, which focused on EPA’s New Source Performance Standards (NSPS) and DEC standards, utilized a standardized review tool for consistency. The review process is meant to identify the cleanest cordwood and pellet heating devices for installation in FNSB.

Table 15 and Table 16 present the overall summary statistics of the cordwood and pellet test review as of February 1, 2021. These statistics will change as manufacturers continue to address report issues.

Table 15. Overall Summary Statistics of Cordwood Test Reports Review

Overall Summary Statistics						
	# of Reports Reviewed	Disapproved (emission threshold)	Disapproved (unable to verify)	No Determination (Report Issues)	Approved/Pending	Approved w/ Flags
ASTM E3053	67	32	2	33	0	0
EPA M28R	62	23	2	8	29	0
Not reported	2	0	2	0	0	0
Total	131	55	6	41	29	0

Table 16. Overall Summary Statistics of Pellet Test Reports Review

Overall Summary Statistics						
	# of Reports Reviewed	Disapproved (emission threshold)	Disapproved (unable to verify)	No Determination (Report Issues)	Approved/Pending	Approved w/ Flags
Other (ATM)	2	0	0	0	2	0
ASTM 2779	83	3	5	34	41	0
Not reported	11	0	11	0	0	0
Total	96	3	16	34	43	0

In summary, no certification test report met all the requirements of the EPA’s NSPS as identified by DEC and NESCAUM. As a result of this review, NESCAUM conducted additional in-depth reviews of reports and lab testing and published its findings. The main concern is that EPA’s certification list alone cannot currently be relied upon to determine if a device is actually providing emission reductions or is a better performer than other devices. Furthermore, because certification tests renewals are not required, devices that are certified may not be required to be re-certified. Therefore, due diligence is needed to ensure that the underlying EPA certification is valid. DEC continues to work with EPA to address the many concerns found in the NESCAUM report and in the DEC review.

Other Efforts in the Area

Local Kiln

In 2020, Aurora Energy Solutions, LLC installed and began operation of a wood drying kiln in Fairbanks. Aurora sold 548 cords of kiln-dried wood in 2020 with an average moisture content of 15%. The availability of additional dry wood to the local market assists in bolstering compliance with dry wood burning requirements. The kiln may prove particularly beneficial to the area as the requirement for only dry wood sales phases in during the fall of 2021.

Expanded Availability and Use of Natural Gas

As of August 2020, the Interior Gas Utility (IGU) had completed construction of a 5.25 million gallon liquified natural gas (LNG) storage tank in Fairbanks and had transported over 2 million gallons of LNG inventory¹ from Cook Inlet near Anchorage. On January 19, 2021, to further enhance the steady supply of natural gas, IGU, signed an initial five-year term agreement with Hilcorp, Alaska LLC, a Cook Inlet operator.² This contract has an option of extension for two additional three-year terms.

On February 25, 2021, IGU opened the 150,000-gallon LNG storage tanks in North Pole.³ This increases the availability of affordable clean-burning natural gas to North Pole residents.

As part of the woodstove change out program, the FNSB runs a conversion program to help residents convert from oil to natural gas or propane burning appliances. This is funded by the FNSB Assembly's \$1 million appropriation launched in 2020. As of December 31, 2020, a total of 110 conversions were completed. IGU has been installing gas lines to satisfy the backlog of Borough funded conversions and pending owner conversion applications. The schedule for completion of these conversions is the 1st Quarter of 2022.

Mass Transit – FNSB Transit Fleet Natural Gas Efforts

While not a committed SIP measure, the natural gas transit conversion effort is mentioned in the SIP. Below is the status of the FNSB efforts regarding the transition to natural gas for the transit fleet.

Transit Maintenance and Storage Facility Upgrades

In 2017, the FNSB received a grant of \$12.8 million through the Federal Transit Administration (FTA). An additional FTA award of \$10.4 million was announced in August of 2020. Both grant awards will be used for design and construction of a new natural gas maintenance/storage facility which will be fully compliant with Compressed Natural Gas (CNG) fuel requirements. Testing on the existing property identified inadequate ground stability which would require significant measures and funding to correct. Financial and logistical analysis suggested moving the project to an alternate location. Having

¹ Interior Gas Utility 2020 Q3 Quarterly Report to the Fairbanks North Star Borough Assembly, <https://www.interiorgas.com/fnsb-quarterly-reports/>

² <https://www.interiorgas.com/interior-gas-utility-announces-long-term-sale-and-purchase-agreement-with-hilcorp/>

³ <https://www.webcenterfairbanks.com/2021/02/26/interior-gas-utility-opens-natural-gas-storage-facility-in-north-pole/>

completed environmental studies, ground stability determination, and receiving FNSB Assembly approval, the FNSB is finalizing the purchase of the alternate transit facility site.

Transit Fleet Replacement Schedule and Funding Sources

The FNSB has been awarded CMAQ funding to be used towards the purchase of CNG vehicles. These CMAQ awards coupled with other transit-related funding provide the FNSB with the funding needed for a total replacement of 13 buses and 10 paratransit style vehicles, or approximately 90% of the total fleet vehicles over a period of years.

The FNSB FY 20/21 budget continues to include the combined use of FTA funding and local match funds to acquire CNG buses. It is the FNSB's intent to continue to use similar funding combinations in the future to procure transit vehicles and continue the transition process.

Acquisition and Installation of CNG Fueling Infrastructure

In April of 2020, the FNSB received CMAQ funding by FAST Planning for the installation of a CNG fueling infrastructure. The project is programmed for federal fiscal years 2021-22.

Fairbanks Area Surface Transportation (FAST) Planning

Additionally, CMAQ funds are used for some of the Fairbanks Area Surface Transportation (FAST) Planning air quality improvement projects within the FNSB that are relevant to winter season PM2.5 emissions. These projects include:

- Fairbanks Adaptive Signal Control
- FNSB Transportation CNG Infrastructure
- Highway Dynamic Messaging Signs/Motor Vehicle Plug-Ins
- Pearl Creek Elementary Access Improvements
- University Avenue South Bicycle & Pedestrian Path
- Sidewalk Snow Removal Equipment
- Bi-directional Two-Way Tow Plow

The FNSB Transportation CNG Infrastructure, Highway Dynamic Messaging Signs/Motor Vehicle Plug-Ins are PM2.5 related projects of particular interest to the nonattainment area.

FNSB Transportation CNG Infrastructure: As described in the previous section, this project is the construction of CNG fueling infrastructure at the FNSB's new maintenance facility to help with the conversion of diesel-fueled transit buses to CNG buses. The funds for the project have been transferred from the Federal Highway Administration (FHWA) to FTA, and the FNSB is in the process of obtaining the transfer letter from FTA.

Highway Dynamic Messaging Signs/Motor Vehicle Plug-Ins: These projects consist of the installation of highway dynamic messaging signs (described previously) and motor vehicle plug-ins in FNSB PM2.5 nonattainment area. The messaging signs will be installed along the Richardson Highway and Badger Road to inform drivers of air quality alerts, hazardous road conditions, and detours/ delays. The funds for the project will be used for the design, construction, and operation. The plug-ins will be installed at Birch Hill Recreation area, Chena Lakes recreation area, Tanana Lakes recreation area, and University

of Alaska Fairbanks' (UAF) U-Park Facility, and the funds for the project will be used for the design, utilities, construction, and operations of the project.

While the drilling for the foundation and the pole design has been completed, FAST Planning and DOT are currently in negotiations with a consultant to perform the design work on the messaging signs. It is expected that the state-coordinated founding and structural design work will be completed by summer of 2021 and the procurement and installation of the signs will be completed by the summer of 2022.

Planning Model Update

EPA, industrial sources, and some members of the public have been interested in the status of DEC's efforts to update the models that are used to project attainment. The data used in the models that supported the Serious SIP are from 2008. DEC initiated a multi-year effort to update the various required models used in SIP Planning. The status of the main efforts are:

- DEC completed development of a modeling platform located at the department that allows staff the ability to conduct in-house modeling to augment contractual modeling efforts. This is intended to assist in offsetting modeling costs, by reducing the need for contractor assistance, and complete modeling tasks in a timelier manner.
- The current SIP used Community Multiscale Air Quality (CMAQ) version 4.7.1 and EPA has released a newer version of the CMAQ model, version 5.3.2. To understand the differences between the two versions and what impact it may have on future air quality planning, DEC has completed a setup, using the existing 2008 meteorological data and 2019 emissions (the baseline from the Serious SIP). A comparison of the two versions using the same data is nearing completion. This will allow DEC to understand how the new CMAQ model version varies from the old version.
- DEC completed identification of new meteorological episodes for use in future planning efforts. Currently, DEC uses 2008 meteorology to represent winter conditions in Fairbanks with two episodes. There will now be one episode from winter 2019/2020 using meteorological data from Hurst Road in North Pole. The previous episodes used the meteorology from the Fairbanks downtown monitor.
- A contract has been initiated and work is underway on efforts to develop new meteorological data using the 2019/2020 winter episode and the Weather Research and Forecast (WRF) model. The current effort will update the meteorology and better represent the winter conditions including the strong inversions present in Fairbanks and North Pole by using additional weather data collected at the Hurst Road monitor and from a study conducted by UAF in the Fort Wainwright area with multiple heights of wind and temperature.
 - The next step in the process is to develop a new emission inventory for the same winter 2019/2020 winter weather episode, December 10th to February 20th. These emissions, meteorology and monitoring data during the same time will allow DEC to a conduct model performance evaluation of PM_{2.5} and precursor pollutants and better represent future concentrations in the model.
- Upcoming tasks: finish the above incomplete items, then begin to develop quality assurance and quality control (QA/QC) runs, performance tests, and then a detailed EPA review of the data from the QA/QC and performance tests. The updated model must gain EPA approval and meet performance standards to be used for future SIPs.

Conclusion

As shown in Table 1, the design value for the FNSB nonattainment area continues to show improvement in air quality and there has been significant progress made to reduce PM_{2.5} since 2014. As the programs identified in the air quality plan continue to be implemented and new programs are initiated, progress toward attainment should continue. The Serious SIP projected attainment of the PM_{2.5} NAAQS in 2024 provided DEC, FNSB, the community and local residents continue to collectively work together in following through with the identified SIP commitments and programs to reduce air pollution. Through the combined actions of local residents and businesses, the area can reach attainment. DEC and the FNSB encourage residents to meet requirements for burning dry wood, update high emitting SFBA's older than 25 years, and cease burning during air alerts. The agencies also encourage residents to learn more about air quality programs and to take advantage of the FNSB change-out and conversion program to update to cleaner burning heating devices. The agencies also acknowledge the efforts of local businesses including real estate firms, wood sellers, and industrial operations in meeting requirements in the SIP. The more individuals and businesses can do collectively to reduce air pollution, the faster attainment will come.

With this initial annual status report, DEC and the FNSB acknowledge that not all aspects of the air quality efforts in the community are highlighted in detail. Do you have a suggestion for what could be added in next year's annual report? Are there programs or information that you would like to hear more about? Please let us know by emailing your suggestions to: dec.air.comment@alaska.gov