



2020 National Emissions Inventory Technical Support Document: Fuel Combustion – Nonpoint Industrial and Commercial/Institutional Boilers and ICEs

EPA-454/R-23-001y
March 2023

2020 National Emissions Inventory Technical Support Document: Fuel Combustion – Nonpoint
Industrial and Commercial/Institutional Boilers and ICEs

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25 Fuel Combustion – Nonpoint Industrial and Commercial/Institutional Boilers and ICES

Industrial, Commercial, and Institutional (ICI) fuel combustion sources are a significant portion of the total emissions inventory for many areas and include emissions from boilers, engines, and other combustion sources from the industrial, commercial, and institutional sectors that are not reported as point sources. This source category includes emissions from combustion of coal, distillate fuel oil, residual fuel oil, kerosene, liquefied petroleum gas (LPG), natural gas, and wood. Unless all ICI combustion emission sources are provided in an S/L/T point inventory submittal, it is necessary for inventory preparers to estimate ICI combustion nonpoint source emissions.

25.1 Sector Descriptions and Overview

The EIS sectors documented in this section include these nonpoint emissions from ICI fuel combustion:

- Fuel Comb - Industrial Boilers, ICES - Biomass
- Fuel Comb - Industrial Boilers, ICES - Coal
- Fuel Comb - Industrial Boilers, ICES - Natural Gas
- Fuel Comb - Industrial Boilers, ICES - Oil
- Fuel Comb - Industrial Boilers, ICES - Other
- Fuel Comb - Comm/Institutional - Biomass
- Fuel Comb - Comm/Institutional - Coal
- Fuel Comb - Comm/Institutional - Natural Gas
- Fuel Comb - Comm/Institutional - Oil
- Fuel Comb - Comm/Institutional - Other

We document all these sectors in this section because EPA generates all the nonpoint emissions from these EIS sectors via the “ICI Tool” module. S/L/Ts were encouraged to submit Point inventory activity data -via many options reflecting sector and fuel type- in order to compute the “remaining” nonpoint emissions component to these sectors.

Table 25-1 shows, for ICI fuel combustion, the nonpoint SCCs covered by the EPA ICI Tool as well emissions directly submitted by State/Local and Tribal agencies for the 2020 NEI. The SCC level 2, 3 and 4 descriptions are also provided except for the last SCC (2801520000), where the full SCC description is provided. The SCC level 1 description is “Stationary Source Fuel Combustion” for all SCCs except the last one. The leading sector description is “Fuel Comb” for all SCCs. Listings of agencies that submitted ICI emissions or input activity data are provided in Section 6.2.3 and Section 6.2.2, respectively, of this TSD.

Table 25-1: Nonpoint ICI SCCs in the 2020 NEI

SCC	Description	Sector	EPA	SLT
2102001000	Industrial; Anthracite Coal; Total: All Boiler Types	Fuel Comb - Industrial Boilers, ICES - Coal	X	X
2102002000	Industrial; Bituminous/Subbituminous Coal; Total: All Boiler Types	Fuel Comb - Industrial Boilers, ICES - Coal	X	X

SCC	Description	Sector	EPA	SLT
2102004000	Industrial; Distillate Oil; Total: Boilers and IC Engines	Fuel Comb - Industrial Boilers, ICEs - Oil		X
2102004001	Industrial; Distillate Oil; All Boiler Types	Fuel Comb - Industrial Boilers, ICEs - Oil	X	X
2102004002	Industrial; Distillate Oil; All IC Engine Types	Fuel Comb - Industrial Boilers, ICEs - Oil	X	X
2102005000	Industrial; Residual Oil; Total: All Boiler Types	Fuel Comb - Industrial Boilers, ICEs - Oil	X	X
2102006000	Industrial; Natural Gas; Total: Boilers and IC Engines	Fuel Comb - Industrial Boilers, ICEs - Natural Gas	X	X
2102007000	Industrial; Liquified Petroleum Gas (LPG); Total: All Boiler Types	Fuel Comb - Industrial Boilers, ICEs - Other	X	X
2102008000	Industrial; Wood; Total: All Boiler Types	Fuel Comb - Industrial Boilers, ICEs - Biomass	X	X
2102010000	Industrial; Process Gas; Total: All Boiler Types	Fuel Comb - Industrial Boilers, ICEs - Other		X
2102011000	Industrial; Kerosene; Total: All Boiler Types	Fuel Comb - Industrial Boilers, ICEs - Oil	X	X
2102012000	Industrial; Waste Oil; Total	Fuel Comb - Industrial Boilers, ICEs - Other		X
2103001000	Commercial/Institutional; Anthracite Coal; Total: All Boiler Types	Fuel Comb - Comm/Institutional - Coal	X	X
2103002000	Commercial/Institutional; Bituminous/Subbituminous Coal; Total: All Boiler Types	Fuel Comb - Comm/Institutional - Coal	X	X
2103004000	Commercial/Institutional; Distillate Oil; Total: Boilers and IC Engines	Fuel Comb - Comm/Institutional - Oil		X
2103004001	Commercial/Institutional; Distillate Oil; Boilers	Fuel Comb - Comm/Institutional - Oil	X	X
2103004002	Commercial/Institutional; Distillate Oil; IC Engines	Fuel Comb - Comm/Institutional - Oil	X	X
2103005000	Commercial/Institutional; Residual Oil; Total: All Boiler Types	Fuel Comb - Comm/Institutional - Oil	X	X
2103006000	Commercial/Institutional; Natural Gas; Total: Boilers and IC Engines	Fuel Comb - Comm/Institutional - Natural Gas	X	X
2103007000	Commercial/Institutional; Liquified Petroleum Gas (LPG); Total: All Combustor Types	Fuel Comb - Comm/Institutional - Other	X	X
2103008000	Commercial/Institutional; Wood; Total: All Boiler Types	Fuel Comb - Comm/Institutional - Biomass	X	X

SCC	Description	Sector	EPA	SLT
2103010000	Commercial/Institutional; Process Gas; Total: All Boiler Types	Fuel Comb - Comm/Institutional - Other		X
2103011000	Commercial/Institutional; Kerosene; Total: All Combustor Types	Fuel Comb - Comm/Institutional - Oil	X	X
2801520000	Miscellaneous Area Sources; Agriculture Production - Crops; Orchard Heaters; Total, all fuels	Fuel Comb - Industrial Boilers, ICEs - Other		X

25.2 EPA-developed estimates

The calculations for estimating emissions from the ICI sectors include estimating the total fuel consumption by sector for each agency, using data from the Energy Information Administration (EIA) State Energy Data System (SEDS) [ref 1]. Total fuel consumption is adjusted to account for fuel consumed by mobile sources in each sector and fuel used as an input to industrial processes but is not combusted. Fuel consumption from nonpoint sources in each state is determined by subtracting fuel consumption from point sources from total fuel consumption. Estimated nonpoint source fuel consumption in each state is distributed to the county level based on the proportion of employment in the industrial and commercial sectors.

25.2.1 Activity data

The activity data for this source category is total fuel consumption in the industrial and commercial/institutional sectors. The default data for this category are obtained from the total state-level fuel consumption in each sector from EIA SEDS [ref 1] for all fuel types except distillate. Distillate fuel consumption is taken from EIA's Form 821 data, which reports distillate sales by state and sector [ref 2]. State-level fuel consumption is allocated to agencies using the ratio of employment in the county corresponding to the local agency to employment in the state. Agency-level fuel consumption is calculated because some states also have local agencies that submit emissions to the NEI, and state, local, and tribal (SLT) agencies are expected to submit fuel consumption data from point sources in these sectors. The agency-level point source fuel consumption is subtracted from the total fuel consumption to estimate the fuel consumption from nonpoint sources. If agencies do not submit fuel consumption data from point sources, EPA default values are used. The point source subtraction method is described in more detail in section 25.2.6.

Total, agency-level fuel consumption is adjusted to account for the fraction of fuel consumed by nonroad mobile sources, whose emissions are included in the nonroad inventory. This fraction is based on results from the National Mobile Inventory Model (NMIM), a precursor to EPA's Motor Vehicle Emission Simulator (MOVES). This adjustment is particularly important for distillate fuel oil consumption. The ICI tool uses distillate consumption data from Form 821 rather than SEDS because Form 821 reports more detailed data by sector, and the ICI tool uses different stationary source fuel consumption assumptions by sector, including the industrial, commercial, farm, off-highway, and oil company sectors. Note that fuel consumption in the farm, off-highway, and oil company sectors are mapped to the industrial sector in the ICI tool. Assumptions about the fraction of fuel consumed by stationary sources are shown in an appendix.

The total fuel consumption is also adjusted to account for fuel used as an input to industrial processes where it is not combusted. These assumptions are based on the EIA Manufacturing Energy Consumption Survey (MECS) [ref 3], which reports total fuel consumption, energy consumption as nonfuel, and energy consumption as by fuel type and Census region. Assumptions about non-combustion use of fuel are shown in Table 25-2. In some cases, EIA withholds the regional-level data on non-combustion use of fuel because it is less than 0.5 million barrels. Where possible in these cases, non-combustion use of fuel is estimated as the difference between total fuel consumption and energy consumption as fuel. A value of 0.25 million barrels is used as the amount of regional-level non-combustion use of fuels for all other cases.

Note that the stationary source adjustment is performed for fuel consumption from both the industrial and commercial/institutional sectors, while the non-combustion use of fuel adjustment is performed only for fuel consumption in the industrial sector.

$$AF_{f,s,x} = TF_{f,s,x} \times SS_{f,s,x} \times (1 - nc_{f,s,industrial}) \quad (1)$$

Where:

- $AF_{f,s,x}$ = Consumption of fuel f by stationary sources for agency s in sector x
- $TF_{f,s,x}$ = Total consumption of fuel f for agency s in sector x , from EIA SEDS
- $SS_{f,s,x}$ = Fraction of fuel f consumed by stationary sources for agency s in sector x
- $nc_{f,s,x}$ = Fraction of fuel f used as an industrial input and is not combusted in the state corresponding to agency s in the industrial sector, from Table 25-1

Table 25-2: Assumptions about non-combustion use of fuel by fuel type and state

State	Coal	Distillate	LPG	Natural Gas	Residual Oil	Kerosene
AL	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
AK	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
AZ	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
AR	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
CA	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
CO	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
CT	87.16%	6.25%	11.11%	4.85%	0.00%	0.00%
DE	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
DC	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
FL	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
GA	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
HI	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
ID	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
IL	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%
IN	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%
IA	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%
KS	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%

State	Coal	Distillate	LPG	Natural Gas	Residual Oil	Kerosene
KY	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
LA	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
ME	87.16%	6.25%	11.11%	4.85%	0.00%	0.00%
MD	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
MA	87.16%	6.25%	11.11%	4.85%	0.00%	0.00%
MI	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%
MN	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%
MS	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
MO	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%
MT	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
NE	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%
NV	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
NH	87.16%	6.25%	11.11%	4.85%	0.00%	0.00%
NJ	87.16%	6.25%	11.11%	4.85%	0.00%	0.00%
NM	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
NY	87.16%	6.25%	11.11%	4.85%	0.00%	0.00%
NC	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
ND	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%
OH	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%
OK	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
OR	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
PA	87.16%	6.25%	11.11%	4.85%	0.00%	0.00%
RI	87.16%	6.25%	11.11%	4.85%	0.00%	0.00%
SC	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
SD	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%
TN	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
TX	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
UT	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
VT	87.16%	6.25%	11.11%	4.85%	0.00%	0.00%
VA	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
WA	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%
WV	38.70%	0.00%	99.27%	19.03%	100.00%	0.00%
WI	53.09%	4.55%	80.00%	5.59%	100.00%	0.00%
WY	1.10%	0.00%	1.45%	4.95%	0.00%	0.00%

The SEDS data do not distinguish between anthracite and bituminous/subbituminous coal consumption estimates. The EIA table “Domestic Distribution of U.S. Coal by Destination State, Consumer, Origin and Method of Transportation” [ref 4] provides state-level coal distribution data for 2006 that is used to estimate the fraction of coal consumption that is anthracite and bituminous/subbituminous. Table 25-3 presents these anthracite and bituminous coal ratios for each state.

Table 25-3: Anthracite and Bituminous Coal Distribution for the Residential and Commercial Sectors

State	Ratio of Bituminous	Ratio of Anthracite	State	Ratio of Bituminous	Ratio of Anthracite
Alabama	1.000	0.000	Montana	1.000	0.000
Alaska	1.000	0.000	Nebraska	1.000	0.000
Arizona	0.814	0.186	Nevada	1.000	0.000
Arkansas	0.814	0.186	New Hampshire	0.000	1.000
California	1.000	0.000	New Jersey	0.000	1.000
Colorado	0.996	0.004	New Mexico	1.000	0.000
Connecticut	0.000	1.000	New York	0.600	0.400
Delaware	0.814	0.186	North Carolina	1.000	0.000
Dist. Columbia	1.000	0.000	North Dakota	1.000	0.000
Florida	0.814	0.186	Ohio	0.873	0.127
Georgia	1.000	0.000	Oklahoma	0.917	0.083
Hawaii	1.000	0.000	Oregon	1.000	0.000
Idaho	0.979	0.021	Pennsylvania	0.194	0.806
Illinois	0.998	0.002	Rhode Island	0.000	1.000
Indiana	0.947	0.053	South Carolina	0.997	0.003
Iowa	0.999	0.001	South Dakota	1.000	0.000
Kansas	1.000	0.000	Tennessee	0.994	0.006
Kentucky	0.998	0.002	Texas	0.814	0.186
Louisiana	1.000	0.000	Utah	1.000	0.000
Maine	0.000	1.000	Vermont	0.000	1.000
Maryland	0.929	0.071	Virginia	0.963	0.037
Massachusetts	0.500	0.500	Washington	1.000	0.000
Michigan	0.667	0.333	West Virginia	0.905	0.095
Minnesota	0.997	0.003	Wisconsin	0.991	0.009
Mississippi	1.000	0.000	Wyoming	1.000	0.000
Missouri	1.000	0.000			

The SEDS data on industrial and commercial coal consumption are split into consumption of anthracite and bituminous/subbituminous coal based on the ratios in Table 25-3.

$$AF_{ant/bit,s,x} = AF_{coal,s,x} \times R_{ant/bit,s} \quad (2)$$

Where:

- $AF_{ant/bit,s,x}$ = Adjusted anthracite or bituminous coal consumption for agency s in sector x
- $AF_{coal,s,x}$ = Total adjusted coal consumption for agency s in sector x , from equation 1
- $R_{ant/bit,s}$ = Ratio of anthracite or bituminous coal to total coal in state corresponding to agency s , from Table 25-2

The EIA Form 821 data report total distillate consumption, but the NEI requires data separately on consumption by boilers and engines, because there are substantially different emissions factors for distillate boilers and engines. The ICI tool uses assumptions based on the EIA MECS [ref 3] and the EIA Commercial Building Energy Consumption Survey (CBECS) [ref 5]. These data sources suggest that in the

industrial sector, 60 percent of distillate consumption is by boilers and 40 percent by engines, and in the commercial sector, 95 percent is by boilers and 5 percent is by engines.

$$AF_{boiler/engine,s,x} = AF_{distillate,s,x} \times R_{boiler/engine,s,x} \quad (3)$$

Where:

- $AF_{boiler/engine,s,x}$ = Adjusted distillate consumption in boilers or engines for agency s in sector x
- $AF_{distillates,x}$ = Total adjusted distillate consumption for agency s in sector x , from equation 1
- $R_{boiler/engine,s,x}$ = Ratio of distillate consumption by boilers or engines in state corresponding to agency s in sector x

Following the adjustments to the total fuel consumption, the total fuel consumption data is also adjusted to subtract fuel consumption from point sources, which is accounted for in the point source inventory. Point source fuel consumption data by fuel type and sector is submitted by SLT agencies and supplemented by EPA defaults. This point source subtraction procedure is described in more detail in section 25.2.6. The point source subtraction step is performed at the state level, and it is done before the allocation procedure discussed in section 25.2.2 and before the emissions calculations discussed in section 25.2.5.

25.2.2 Allocation procedure

SEDS data are reported at the state level. Following the allocation to agencies and the adjustments to the agency-level fuel consumption discussed in section 25.2.1 and the point source subtraction discussed below in section 25.2.6, the estimated agency-level nonpoint source activity data in each state is distributed to the county level based on employment in the industrial or commercial sector from the Census Bureau’s County Business Patterns [ref 6]. Employment in each sector is determined based on the crosswalk between North American Industrial Classification System (NAICS) codes in the Point inventory and sectors, as shown in Table 25-4, where “Commercial” is interchangeable with the EIS “Commercial/Institutional” sector definition.

Table 25-4: Mapping of NAICS codes to ICI sectors

NAICS	Sector
11	Industrial
21	Industrial
2212	Commercial
2213	Commercial
23	Industrial
31	Industrial
32	Industrial
33	Industrial
42	Commercial
44	Commercial

NAICS	Sector
45	Commercial
48 (except 4862)	Commercial
49	Commercial
51	Commercial
52	Commercial
53	Commercial
54	Commercial
55	Commercial
56	Commercial
61	Commercial
62	Commercial
71	Commercial
72	Commercial
81	Commercial
92	Commercial

The adjusted nonpoint fuel consumption in each state is distributed to the county based on the proportion of employment in each county in each sector to the total employment at the state level in each sector. Figure 25-1 and Figure 25-2 outline the steps to calculate activity and ICI emissions, including adjusted fuel consumption and the allocation procedures described here.

$$NPF_{f,c,x} = NPF_{f,s,x} \times \frac{emp_{c,x}}{emp_{s,x}} \quad (1)$$

Where:

- $NPF_{f,c,x}$ = Adjusted nonpoint consumption of fuel f in county c in sector x
- $NPF_{f,s,x}$ = Adjusted nonpoint consumption of fuel f for agency s in sector x , from equation 6
- $emp_{c,x}$ = Employment in county c in sector x
- $emp_{s,x}$ = Employment in state s in sector x

Figure 25-1: Overview of ICI Calculations, Part 1

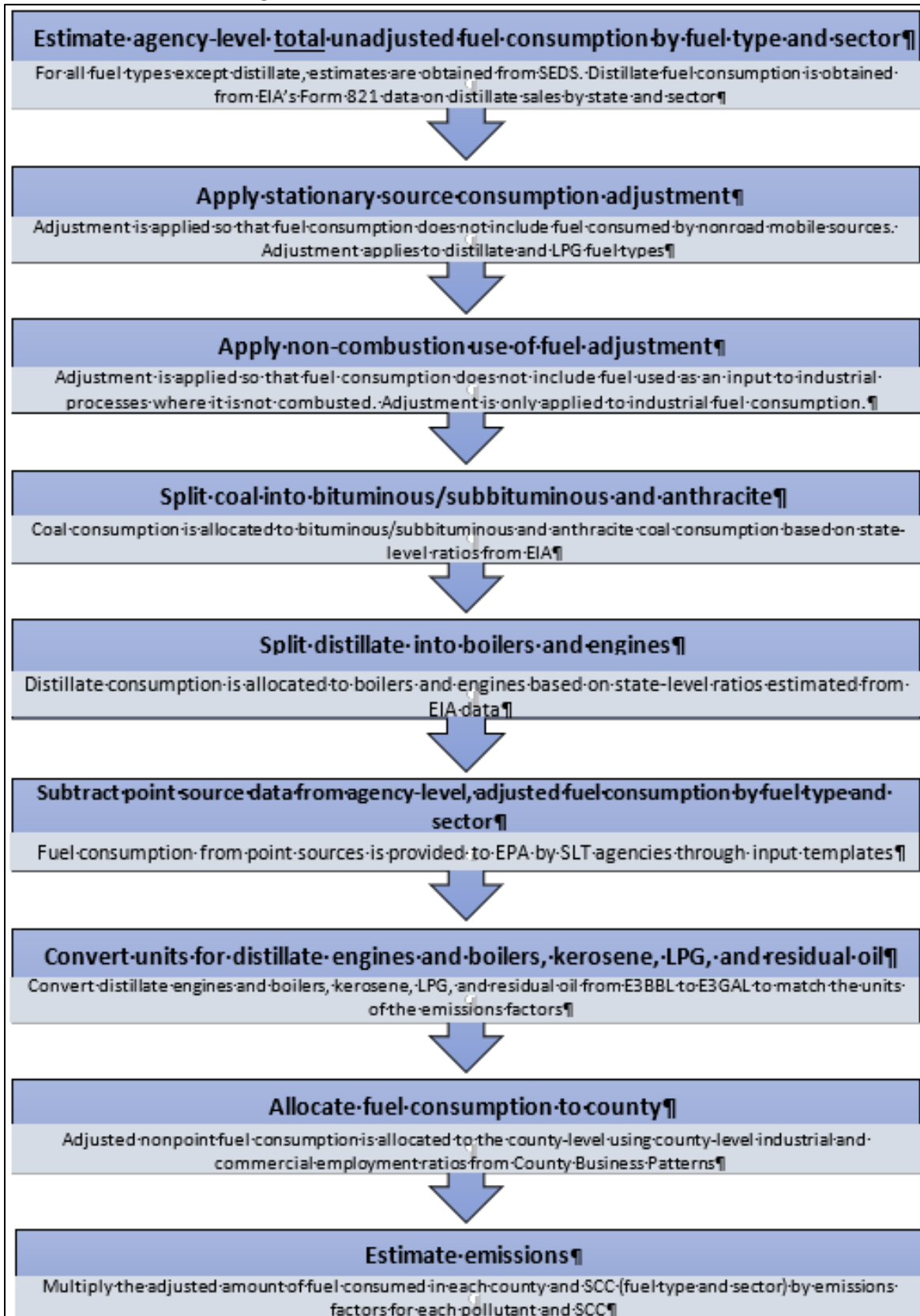
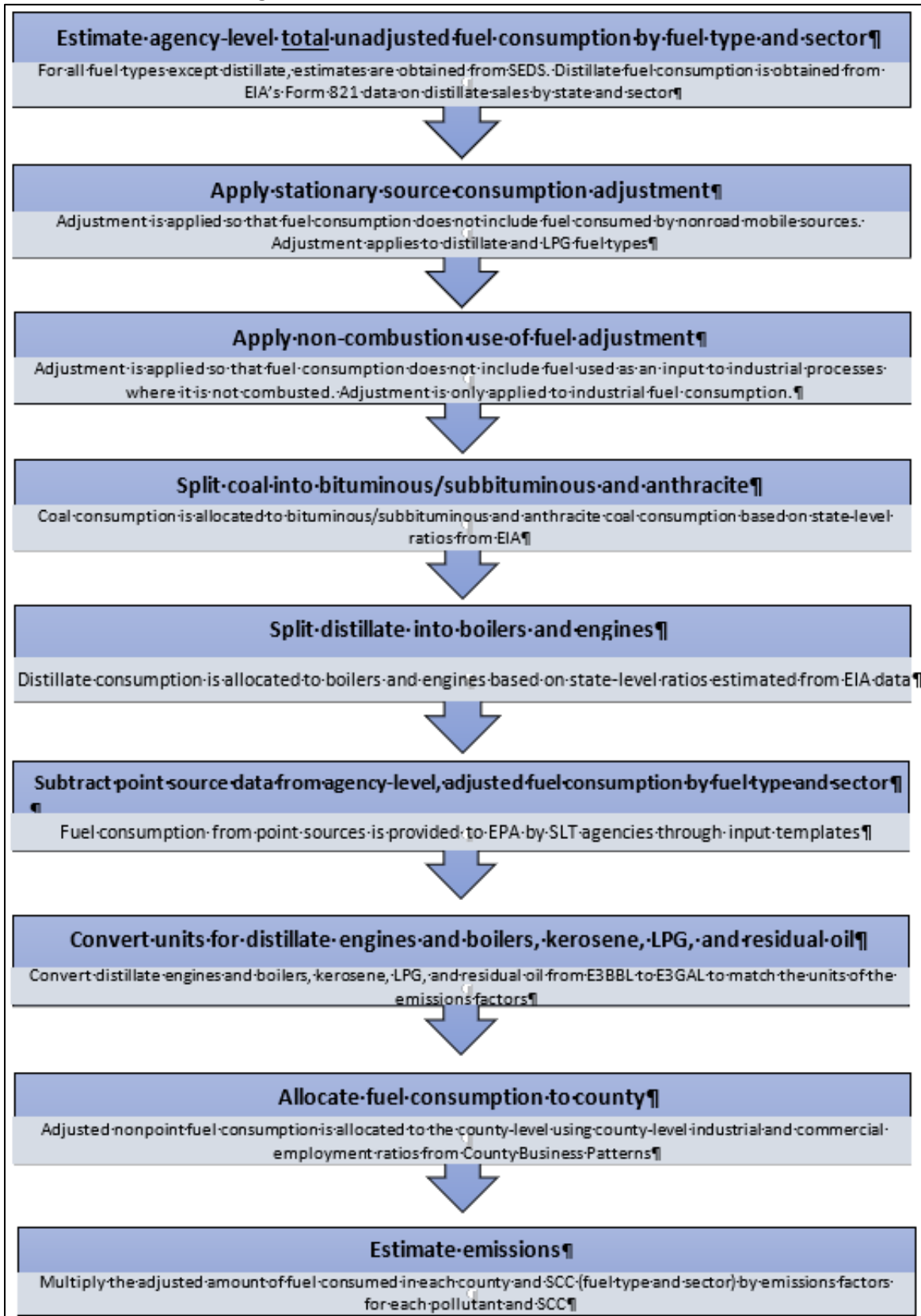


Figure 25-2: Overview of ICI Calculations, Part 2



25.2.3 Emission factors

The emissions factors for ICI sectors are from AP-42 [ref 7] and a spreadsheet developed in 2010 by EPA and the Eastern Regional Technical Advisory Committee [ref 8]. The emissions factors for ammonia are taken from one of two reports from EPA on ammonia emissions in the ICI sectors [ref 9, ref 10]. The emissions factors for hazardous air pollutants from wood combustion in the ICI sectors are taken from EPA’s SPECIATE database [ref 11]. These emission factors are provided in the “Wagon Wheel Emission Factor Compendium” on the [2020 NEI Supporting Data and Summaries site](#).

The SO₂ emissions factors for commercial and industrial bituminous coal are calculated using sulfur content of fuel. State-level sulfur content of bituminous coal is reported by EIA’s Coal Data Browser and applied at the county level [ref 12]. Bituminous sulfur content data can be found in the Coal Consumption and Quality Data Set, filtered to only account for commercial and institutional sources. For states where bituminous sulfur content data is not reported by EIA, the bituminous sulfur content for the region corresponding to that state is used.

25.2.4 Controls

There are no controls assumed for this category. However, the ICI tool includes options for SLT agencies to submit pollutant-, SCC-, and county- or state-specific control factors if needed. These control factors are a number between 0 and 1 that is multiplied by the emissions for that pollutant, SCC, and county. These factors allow SLT agencies to “fine tune” emissions estimates based on their understanding of how specific national and local rules combined with their penetration/effectiveness could lead to “composite-rule” emission factors for specific counties and pollutants. The relative difference between these “composite-rule” and default ICI tool emission factors can then be used to compute SCC-, county-, and pollutant-specific “controls.”

Alternatively, SLT agencies can adjust the emissions factors; however, this would affect the calculation of emissions for all counties in the state.

25.2.5 Emissions

Emissions in each ICI sector are estimated by multiplying the county-level nonpoint source fuel consumption by the emission factors from the “Wagon Wheel Emission Factor Compendium” on the [2020 NEI Supporting Data and Summaries site](#).

$$E_{p,f,c,x} = NPF_{f,c,x} \times EF_{p,f,x} \quad (1)$$

Where:

$E_{p,f,c,x}$	=	Annual emissions of pollutant p from fuel type f in county c in sector x
$NPF_{f,c,x}$	=	Nonpoint source consumption of fuel type f in county c in sector x
$EF_{p,f,x}$	=	Emissions factor for pollutant p , fuel type f , and sector x

25.2.6 Point Source subtraction

The adjusted fuel consumption discussed in section 25.2.1 is an estimate of the agency-level total fuel combusted for all sources, including point and nonpoint sources. To estimate the fuel consumption from only nonpoint sources, the fuel consumption from point sources is subtracted from the total adjusted fuel consumption. The fuel consumption from point sources is provided to EPA by SLT agencies. While the 2017 NEI did not include default point source data, the 2020 NEI uses EPA developed default point source fuel consumption by sector and fuel type for states that did not submit point source data in input templates. The EPA default data is estimated based on SLT agency submissions to the point inventory.

The starting point for computing state-level point fuel consumption ($PF_{f,s,x}$) begins by matching NEI (EIS/state) facility identifier codes with EIA facilities in EIA-923 data [ref 13] to identify facilities that are in the industrial, commercial, or electric utility sectors. NEI facilities that match EIA-923 facilities with EIA sector assignments of 4 (Commercial NAICS Non-Co-gen) or 5 (Commercial NAICS Cogen) are assigned as “Commercial/Institutional” whose point source throughput activity data (consumption) are subject to Point subtraction from EIA SEDS. Similarly, NEI facilities that match EIA-923 facilities with EIA sector assignments of 6 (Industrial NAICS Non-Co-gen) or 7 (Industrial NAICS Cogen) are assigned as “Commercial/Institutional” whose point source throughput activity data (consumption) are subject to Point subtraction from EIA SEDS. NEI facilities that match EIA-923 facilities with EIA sector assignments of 1, 2 or 3 (Electric Utility, NAICS-22 Non-Cogen, and NAICS-22 Cogen, respectively) are assigned as “EGU” and thus not subject to Point “ICI” subtraction. An existing EIA 923 to NEI (EIS/state) facility ID cross-reference to EIA ICI sectors is available for each state “ICI_sector_assignments_2020SLT_EIA923_then_NAICS.xlsx” on the [2020 NEI Supplemental Nonpoint data FTP site](#).

The remaining facilities that are not matched to EIA-923 facilities are then assigned to “Industrial”, “Commercial/Institutional” or “N/A” based on facility NAICS codes provided in Table 25-4.

Once all point facilities have been mapped to the appropriate sector via either the EIA-923 or the NAICS assignments, the point inventory fuel consumption data are then aggregated by fuels using one of four different options to identify the fuel:

- **Option A: By NAICS and SCC.** In this option, SLT agencies submit state-level point source data aggregated by NAICS code and SCC. NAICS codes are used to map the point source fuel consumption to the appropriate ICI sector according to the mapping in Table 25-4. SCCs are used to identify the type of fuel consumed, according to the mapping “ICI_fuel_SCC_crosswalk.xlsx” available on the [2020 NEI Supplemental Nonpoint data FTP site](#).
- **Option B: By NAICS and Fuel Type.** If the SLT agency knows the type of fuel consumed at each facility, the agency can submit fuel consumption by fuel type and NAICS. As with option A, the NAICS code will be used to map the fuel consumption to the appropriate sector.
- **Option C: Point Source Fuel Consumption By Sector and Fuel Type.** If the SLT agency has an alternative approach for determining the state-level fuel consumption by point sources in the industrial and commercial/institutional sectors by fuel type, the agency can submit this data directly.
- **Option D: Nonpoint Source Fuel Consumption By Sector and Fuel Type.** If the SLT agency has an alternative approach for determining the state-level fuel consumption by nonpoint sources in the industrial and commercial/institutional sectors by fuel type, the agency can submit this data directly. If the SLT agency chooses this option, point source subtraction is not needed, and the

nonpoint source fuel consumption will be used directly to estimate emissions without further adjustment.

$$NPF_{f,s,x} = AF_{f,s,x} - PF_{f,s,x} \quad (4)$$

Where:

- $NPF_{f,s,x}$ = Adjusted nonpoint consumption of fuel f in state s in sector x
- $AF_{f,s,x}$ = Total consumption of fuel f in state s in sector x , adjusted as discussed in section 25.2.1
- $PF_{f,s,x}$ = Consumption of fuel f by point sources in state s in sector x

Following point source subtraction at the state level, the estimated state-level nonpoint source fuel consumption is distributed to the states based on employment in the industrial and commercial sectors. This allocation procedure is discussed in section 25.2.2.

25.2.7 Example calculations

Table 25-5 lists sample calculations to determine PM25-PRI emissions from nonpoint source bituminous/subbituminous coal combustion in the industrial sector in Alamance County, North Carolina. Note that the equations in the table are listed in the order of the calculations, not in the order in which they are presented in this document. Note also that the point source fuel consumption used in equation 6 is just shown as an example and is not actual point source fuel consumption data submitted by an SLT agency.

Table 25-5: Sample calculations for PM25-PRI emissions from nonpoint industrial sector source bituminous/subbituminous coal combustion in Alamance County, NC

Eq. #	Equation	Values for Alamance County, NC	Result
1	$AF_{f,s,x} = TF_{f,s,x} \times SS_{f,s,x} \times (1 - nc_{f,s,industrial})$	<p>454 thousand tons coal consumption in the industrial sector in NC $\times 1$ [fraction of coal used by stationary sources] $\times (1 - 0.2632$ [fraction of coal in NC used as input to industrial process])</p>	334.5 thousand tons adjusted industrial coal consumption in NC
2	$AF_{ant/bit,s,x} = AF_{coal,s,x} \times R_{ant/bit,s}$	<p>334.5 thousand tons coal $\times 1$ [fraction of bit/subbit coal consumption]</p>	334.5 thousand tons industrial bituminous/subbituminous coal consumption in NC
3	$AF_{boiler/engine,s,x} = AF_{distillate,s,x} \times R_{boiler/engine,s}$	N/A	Not needed for coal consumption

Eq. #	Equation	Values for Alamance County, NC	Result
6	$NPF_{f,s,x}$ $= AF_{f,s,x}$ $- PF_{f,s,x}$	<p>334.5 thousand tons bit/subbit coal</p> <p>– 300 tons point source bit/subbit coal consumption</p>	34.5 thousand tons industrial nonpoint source bituminous/subbituminous coal consumption
4	$NPF_{f,c,x}$ $= NPF_{f,s,x}$ $\times \frac{emp_{c,x}}{emp_{s,x}}$	<p>34.5 thousand tons</p> $\times \frac{17,733 \text{ industrial employees in Alamance}}{861,292 \text{ industrial employees in NC}}$	0.71 thousand tons industrial nonpoint source bituminous/subbituminous coal consumption in Alamance County, NC
5	$E_{p,f,c,x}$ $= NPF_{f,c,x}$ $\times EF_{p,f,x}$	<p>0.71 thousand tons × 2.44 lbs PM25 – PRI/ton</p>	1,732 lbs. (0.866 tons) PM25-PRI emissions from industrial nonpoint source bituminous/subbituminous coal consumption in Alamance County

25.2.8 Improvements/Changes in the 2020 NEI

The 2017 NEI calculated chromium emissions for both industrial and commercial distillate boilers. For 2020, the chromium emissions factors were removed and replaced with chromium III and chromium VI emissions factors.

For the 2020 NEI, the default sulfur content of industrial distillate fuel was updated from 300 ppm to 15 ppm, based on the content for ultra-low sulfur distillate. An error was also fixed in the SO2 emission factor for industrial and commercial distillate boilers, updated the emissions factor from 25 to 1425.

As discussed in section 25.2.6, EPA developed default point source data for all SLT agencies based on submissions to the point inventory so that point source subtraction may be applied regardless of the submission of a point source input template. Default point source data was not developed for the 2017

NEI, so many counties' ICI emissions are lower than they were in 2017 due to the use of default point source data. In addition to the use of default point source data, the calculations were updated so that point source subtraction is carried out at the agency level to account for local agencies that submit data. Thus, the calculations were updated to estimate agency-level adjusted fuel consumption; for the 2017 NEI, state-level fuel consumption was used for the calculations, and point source subtraction occurred at the state level.

When updating the activity data to calculate emissions, some gaps were identified in EIA data. The nonfuel data reported to MECS that is used to adjust fuel consumption is withheld if use is less than 0.5 million barrels. Therefore, the difference between total fuel consumption and consumption of energy used as fuel was used to estimate nonfuel use in cases where data was withheld. EIA data on state-level sulfur content of fuel was also withheld in some cases; where state-level data was withheld, regional-level sulfur content was used instead. More information about these data is in section 25.2.1 and section 25.2.3.

For 2020, a state-level control factor input template was created so that in addition to county-level controls, SLT agencies may submit pollutant-, SCC-, and state-specific control factors. More information about control factors is in section 25.2.4.

An error was also corrected in the calculation tool for this sector regarding PM emissions. The calculations were updated for PM10-FIL and PM25-FIL residual oil emissions for industrial and commercial/institutional sectors, which were previously incorrectly using the same formula for both sectors.

25.2.9 Puerto Rico and U.S. Virgin Islands

Since insufficient data exists to calculate emissions from the ICI sectors for the counties in Puerto Rico and the US Virgin Islands, emissions are based on two proxy counties in Florida: 12011, Broward County for Puerto Rico and 12087, Monroe County for the US Virgin Islands. The total emissions in tons for these two Florida counties are divided by their respective populations creating a tons per capita emissions factor. For each Puerto Rico and US Virgin Island county, the tons per capita emissions factor is multiplied by the county population (from the same year as the inventory's activity data) which served as the activity data. In these cases, the throughput (activity data) unit and the emissions denominator unit are "EACH".

25.3 References

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United States
Environmental Protection
Agency

Office of Air Quality Planning and Standards
Air Quality Assessment Division
Research Triangle Park, NC

Publication No. EPA-454/R-23-001y
March 2023
