# Appendix 4-5:
# 2020 Projection Emission Inventory
# Point and Area Sources

## 1.0 Introduction

### 1.1 Statutory Requirement

As discussed in Chapter 4, 2011 was chosen as the base emission inventory year for the attainment demonstration and annual modeling inventory for compliance with the 75 ppb ozone standard. For statewide and regional consistency purposes, 2011 was also chosen as the base year for the Reasonable Further Progress (RFP) demonstration.

Based on New Jersey's reclassification from moderate to serious for its northern NAA[1], New Jersey is required to show an additional 3 percent per year reduction from 2017 to 2020 to comply with RFP from 2017 to 2020. As required for RFP, this SIP presents an estimated 2020 projection inventory for ozone precursor summer tons per day emissions. This SIP updates the 2017 projection inventory with New Jersey's actual 2017 emissions inventory as documented in Chapter 10. The actual 2017 emissions inventory serves as the new base year for the RFP required projection to 2020 for the 75 ppb ozone standard. The actual 2017 emission inventory was used as the base for projecting the 2020 summer day inventory instead of the 2011 base because actual 2017 provides the most up to date base inventory.

### 1.2 Projection Emissions Inventories

In order to determine future inventory trends it is necessary to first grow the base inventory to the year of interest and then account for the reductions achieved from any control measures, Federal or State, which were applicable prior to or in that year. The starting inventory for the projections is the 2017 actual emission inventories for emissions in summer tons per day for volatile organic compounds (VOC), oxides of nitrogen ($NO_x$), and carbon monoxide (CO). The projected emission inventories are "grown" from the 2017 actual emission inventory and then "controlled".

In order to project future year emissions, it is necessary to determine appropriate growth factors and the applicable control efficiencies. The projected emission inventories for 2020 were calculated by first estimating growth in each source category, in each of the inventory sectors. As appropriate, the 2017 actual emission inventories were used as the base for applying factors to account for inventory growth. The United States Environmental Protection Agency (USEPA) preferred approach for projecting emissions growth incorporates locality-specific estimates such as population, employment, historical averaging; or other category-specific activity such as fuel consumption, product output, vehicle miles traveled, or equipment populations.[2]

Annual growth rates were evaluated for each of the emission categories. Growth factors were calculated for a specific range of years and used in spreadsheets or databases to calculate future year emissions.

Once the emission inventories are grown, the next step is to determine which control measures within each of the various

[1] 84 Fed. Reg. 44238 (August 23, 2019)
[2] Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, U.S. Environmental Protection Agency, July 2017.

s emission sectors would be in place during or prior to that year and apply the emission reduction benefits from those control measures. The combined effects of growth and controls represents the inventory projection. Post-2017 control measure benefits (including benefits from pre-2017 measures that have future effective dates or equipment turnover) were applied to each emission sector as appropriate.

## 2.0 Point Sources

### 2.1 Electric Generation Unit (EGU) Point Source Growth and Control

Previously in the 2017, 75 ppb 8-hour ozone attainment demonstration SIP revision [3] for the New Jersey portion of the northern NAA, the estimated control measure benefits between the base year of 2011 and the projected future year of 2017 were calculated using a combination of existing State and federal inventory data and the Eastern Regional Technical Advisory Committee (ERTAC) EGU Forecast Tool. The estimated benefits predicted a reduction of 14.2 NOx summer TPD and a reduction of 2.9 VOC summer TPD between 2011 and 2017. Since publication of that SIP the peak ozone season tons per day for 2017 was reported to New Jersey through the Emission Statement Program. The updated estimated EGU emission reductions from 2011 to 2017 using emission statement datais 35.9 NOx summer TPD and 3.3 VOC summer TPD.

The following methodology was used to estimate summer tons per day for the 2020 future projection year using the New Jersey 2017 Emission Statement Program data (ES) and the latest USEPA Clean Air Markets Division (CAMD) hourly emissions data (https://ampd.epa.gov/ampd/).

To calculate NOx summer tons per day where a unit was existing in the 2017 base year the following equation was used:

NOx Unit 2020 Emissions (summer tons per day) =
(2017 CAMD NOx summer tpd / 2020 CAMD NOx summer tpd) * 2017 ES NOx

Where:
ES = Emissions from Emission Statements in summer tons per day
CAMD NOx summer tpd =
(CAMD peak ozone season NOx in tons/CAMD peak ozone season Operating hours)*24
Peak Ozone Season or Summer = June, July, August

To calculate VOC and CO summer tons per day where a unit was existing in the 2017 base year the following equation was used:

VOC and CO Unit 2020 Emissions (summer tons per day) =
(2020 CAMD summer Operating hours / 2017 CAMD summer Operating hours)* 2017 CO or VOC

Where:
ES = Emissions from Emission Statements in summer tons per day

[3] State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the 75 ppb and 84 ppb Ozone National Ambient Air Quality Standards, Ozone Attainment Demonstration and Nonattainment New Source Review (NNSR) Program Compliance Certification, January 8, 2018, https://www.nj.gov/dep/baqp/ozone75ppb/Ozone%2075%20ppb%20Attain%20North-NNSR%20SIP%2012-14-17%20Revised%208-9-18.pdf

CAMD NOx summer tpd =
(CAMD peak ozone season NOx in tons/CAMD peak ozone season Operating hours)*24
Peak Ozone Season or Summer = June, July, August

For new units operational after 2017 the following equation was used to calculate NOx:

NOx Unit 2020 Emissions (summer tons per day) =
(CAMD peak ozone season NOx in tons/CAMD peak ozone season Operating hours)*24

Where:
Peak Ozone Season or Summer = June, July, August

For the two new units operational after 2017 no ES data or CAMD data was available to project the VOC CO values in these few cases the peak ozone season summer tons per day was taken from the ERTAC EGU Forecast Tool discussed in Chapter 4 EMISSION INVENTORIES FOR 2008 OZONE NAAQS, Section 4.1 Regional Modeling Air Emission Inventory.

The combined grown and controlled EGU emissions, including the emission reductions from control measure benefits are shown in Attachment 1.

## 2.2 Non-Electric Generation Unit (non-EGU) Point Sources Growth

For the non-EGU point source sector, emission growth factors were estimated from 2017 to 2020 and applied to the 2017 inventory at the unit level. Each facility and unit were evaluated based on the North American Industry Classification System (NAICS) codes [4], the United States Environmental Protection Agency (USEPA) Source Classification Codes (SCC), and state specific information reported in New Jersey's emission statement program including: 1. New Jersey facility description; 2. New Jersey equipment type; and 3. New Jersey fuel type.

Emissions associated with petroleum storage and transportation, and asphalt storage (evaporative emissions and emissions from natural gas pipeline compressors) were grown using the United States Department of Energy (USDOE) Energy Information Administration (EIA), Annual Energy Outlook (AEO) Report for 2018. AEO fuel projections were used to calculate growth factors, and AEO categories were aligned with the best fit for the emission source.

The remaining point source emissions were grown using employment projections from the New Jersey Department of Labor (NJDOL) and Workforce Development's Industry and Occupational Employment Projections[5]. Facilities are assigned NAICS codes at the five digit level. The NJDOL projections are at the three digit NAICS code level. NJDOL employment projections were used to calculate growth factors, and NJDOL NAICS categories were aligned with the best fit for the emission source.

The growth factors are shown in the non-EGU point source emission inventory by unit in Attachment 2. The non-EGU point source emission inventories by unit, source classification code (SCC) code and facility are included as Attachments 2, 3 and 4, respectively.

[4] The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.
[5] Statewide Industry and Occupational Projections Tables 2016-2026, released October 2018, downloaded 2/28/2019. https://nj.gov/labor/lpa/employ/indoccpj/indoccpj_index.html

## 2.3 Non-Electric Generation Unit (non-EGU) Point Sources Control Factors

New Jersey and the USEPA have implemented control measures that reduce point source emissions of air pollutants. For non-EGU point sources, control factors for post-2017 rules were applied to the 2020 grown, uncontrolled non-EGU Point Source inventory in order to estimate the projected 2020 emissions inventory. The equation that was used to project emissions in a future year, y, incorporating growth and the application of new control measures between year x and year y is:

$$E_y = E_x * GF^{x-y} * [1 - (CE * RE * RP)^{x-y}]$$

where:

Ey = Controlled emissions in year y
Ex = Controlled emissions in year x
$GF^{x-y}$ = Growth factor used to grow emissions from year x to year y
CE = Control efficiency factor for a control measure implemented between years X and Y
RE = Rule Effectiveness Factor
RP = Rule Penetration Factor
CF=Control Factor = $[1 - (CE * RE * RP)^{x-y}]$

The control factors (CF) applied to the 2017 non-EGU point source inventory are shown in Attachment 2.

## 2.4 Point Source Control Measures

The 2017 emission inventory was used as a base for the projection inventory. The existing control measures which reduce point source emissions for $NO_x$, VOC, and CO in the projection inventory from 2017 to 2020 are shown in Table 1.

**`Table 1**
**Point Source Control Measures for the**
**Northern NJ-NY-CT Nonattainment Area**

| Federal or State | Control Measure | New Jersey Administrative Code | Pollutants |
|---|---|---|---|
| New Jersey | Fiberglass Boat Manufacturing Materials (2008 CTG) | 7:27-16.14 | VOC |
| New Jersey | Industrial Cleaning Solvents (2006 CTG) | 7:27-16.24 | VOC |
| New Jersey | Misc. Metal and Plastic Parts Coatings (2008 CTG) | 7:27-16.15 | VOC |
| New Jersey | Paper, Film, and Foil Coatings (2007 CTG) | 7:27-16.7 | VOC |
| New Jersey | Stationary Gas Turbines and Engines (NOx ACT) | 7:27-19.5, 19.8 | NOx |
| New Jersey | Petroleum Storage | 7:27-16.2 | VOC |
| **Control measures not located in NNJ-NY-CT NAA** | | | |
| New Jersey | EGU: BL England Administrative Consent Order (ACO) | NA | NOx,SO2, VOC |

A discussion of the control measure control factors is included below. The rules are discussed in more detail in Chapter 3. The control factors used in the inventory are included in Attachment 2.

**Stationary Gas Turbines and Engines (NOx ACT)**

At N.J.A.C. 7:27-19.5, NJDEP adopted new standards for $NO_x$ emissions from existing simple cycle combustion turbines combusting natural gas compressing gaseous fuel at major $NO_x$ facilities (compressor turbines). At N.J.A.C. 7:27-19.8, NJDEP adopted new standards for $NO_x$ emissions from stationary reciprocating engines combusting natural gas and compressing gaseous fuel at major $NO_x$ facilities (compressor engines). These rules address NOx RACT requirements by establishing new limits on NOx emissions from existing simple cycle combustion turbines combusting natural gas and compressing gaseous fuel at major NOx facilities (compressor turbines) and stationary reciprocating engines combusting natural gas and compressing gaseous fuel at major NOx facilities (compressor engines). The final rules are effective November 6, 2017 (49 N.J.R. 3518.) The effective date of the NOx emission benefits is November 6, 2019.

**Fiberglass Boat Manufacturing Materials (2008 Control Technique Guidelines)**

USEPA issued a Control Technique Guideline (CTG) in 2008 that provided control recommendations for reducing VOC emissions from the use of gel coats, resins, and materials used to clean application equipment in fiberglass boat manufacturing operations. These control approaches are recommended for all fiberglass boat manufacturing facilities where total actual VOC emissions from all fiberglass boat manufacturing operations are equal to or exceed 15 pounds per day. The NJDEP proposed new rules at N.J.A.C. 7:27-16.14 on January 3, 2017. The final rules are effective November 6, 2017 (49 N.J.R. 3518.). The new rules are based on the USEPA CTG, which establish an applicability limit of actual VOC emissions, before add-on control, of 15 pounds per day from all fiberglass boat manufacturing operations. There were no fiberglassboat manufacturing operations identified in New Jersey's northern NAA that met the applicability limit.

**Industrial Cleaning Solvents (2006 Control Technique Guidelines)**

USEPA issued a CTG for industrial cleaning solvents in 2006 that provided control recommendations for reducing VOC emissions from industrial cleaning solvents used by many industries. The recommended measures for controlling VOC emissions from the use, storage and disposal of industrial cleaning solvents includes work practice standards, limitations on VOC content of the cleaning materials, and an optional alternative limit on composite vapor pressure of the cleaning materials. The NJDEP proposed new rules at N.J.A.C. 7:27-16.24 on January 3, 2017. The final rules are effective November 6, 2017 (49 N.J.R. 3518.) This rule was estimated to reduce VOCs by 90% from these sources. A rule effectiveness of 100% and a rule penetration of 100% was applied.

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**Misc. Metal and Plastic Parts Coatings (2008 Control Technique Guidelines ):**

USEPA issued a CTG for miscellaneous metal and plastic parts coatings in 2008 that provided control recommendations for reducing VOC emissions from for miscellaneous metal and plastic parts coatings and associated work practices. The NJDEP proposed new rules at N.J.A.C. 7:27-16.15 on January 3, 2017. The final rules are effective November 6, 2017 (49 N.J.R. 3518.) The new rules are based on the USEPA CTG, which specify an applicability limit of 2.7 tons of actual VOC emissions during any consecutive 12-month period from all miscellaneous metal

and plastic part coating operations, including related cleaning activities. This rule was estimated to reduce VOCs by 90% from these sources. A rule effectiveness of 100% and a rule penetration of 100% was applied.

**Paper, Film, and Foil Coatings (2007 Control Technique Guidelines ):**

USEPA issued CTG in 2008 that provided control recommendations for reducing VOC emissions from paper, film and foil coatings. USEPA recommended applying the control recommendations for coatings only to individual paper, film and foil surface coating lines with the potential to emit at least 25 tpy of VOC from coatings, prior to controls. The NJDEP proposed amendments to N.J.A.C. 7:27-16.7 on January 3, 2017. The final rules are effective November 6, 2017 (49 N.J.R. 3518.) The new rules are based on the CTG, which requires paper, film, and foil coating operations to implement best management practices if the actual VOC emissions exceed 15 pounds per day for all coating operations. This rule was estimated to reduce VOCs by 90% from these sources. A rule effectiveness of 100% and a rule penetration of 100% was applied.

**Petroleum Storage**

The NJDEP adopted amendments to N.J.A.C. 7:27-16.2, on April 20, 2009, which established requirements to reduce VOC emissions from bulk petroleum storage facilities. The rule identified specific requirements and the State estimated VOC percent reduction for individual years between 2012 and 2020. The estimated % reductions from the rule are shown in the table below. A rule effectiveness of 80% and a rule penetration of 100% was applied. The control efficiencies are shown in Attachment 2.

| Year | % Reduction per year |
|---|---|
| 2012 | 0.86% |
| 2013 | 1.72% |
| 2014 | 2.58% |
| 2015 | 3.44% |
| 2016 | 4.30% |
| 2017 | 5.16% |
| 2018 | 6.02% |
| 2019 | 6.88% |
| 2020 | 7.74% |

**<u>Control measures not located in Northern NJ-NY-CT Nonattainment Area:</u>**

**EGU Administrative Consent Order (ACO): BL England**

On January 24, 2006, an ACO was signed with B.L.England to reduce air pollutants from its EGUs. The ACO was amended on October 31, 2006, January 13, 2010 and May 18, 2012. Under the ACO agreement, B.L. England initially reduced air pollutants by shutting down one of its coal-fired units (Unit 1) since 2013. Rather than convert the remaining units, B.L. England ceased operation of all units by May 1, 2019. Their permit was terminated December 3, 2019.

## 2.5 Point Source Emission Inventory

Table 2 summarizes the 2020 projected point source emission inventory by county for $NO_x$, VOC, and CO. Attachments 1 - 4, contain the detailed point source emission inventories. These attachments are only available electronically.

**Table 2**
**2020 Point Source Emission Inventory by County and Pollutant**

| County | VOC | $NO_x$ | CO |
|---|---|---|---|
| **Non-EGU Point Peak Summer Tons Per Day** | | | |
| **New Jersey Portion of Northern NJ-NY-CT NAA** | | | |
| Bergen | 1.75 | 0.70 | 0.56 |
| Essex | 0.97 | 3.24 | 0.90 |
| Hudson | 1.65 | 0.28 | 0.15 |
| Hunterdon | 0.09 | 0.27 | 0.05 |
| Middlesex | 14.68 | 2.65 | 6.19 |
| Monmouth | 0.40 | 0.42 | 0.31 |
| Morris | 0.39 | 0.73 | 0.55 |
| Passaic | 0.71 | 0.15 | 0.18 |
| Somerset | 0.66 | 4.64 | 2.01 |
| Sussex | 0.16 | 0.10 | 1.33 |
| Union | 3.12 | 5.65 | 1.35 |
| Warren | 0.21 | 0.76 | 0.25 |
| **Non-EGU Total** | **24.79** | **19.58** | **13.84** |
| **EGU Summer Tons Per Day** | | | |
| Bergen | 0.04 | 1.23 | 0.29 |
| Essex | 0.04 | 0.48 | 0.06 |
| Hudson | 0.07 | 0.47 | 0.31 |
| Hunterdon | 0.01 | 1.00 | 1.96 |
| Middlesex | 0.20 | 3.28 | 0.97 |
| Union | 0.13 | 2.97 | 0.84 |
| **EGU Total** | **0.49** | **9.44** | **4.42** |
| **TOTAL POINT** | | | |
| **TOTAL POINT** | **25.28** | **29.01** | **18.26** |

## 3.0 Area Sources

### 3.1 Growth

Growth factors were calculated for area sources utilizing state population projections, USDOE fuel consumption projections, employment projections from the New Jersey Department of Labor, and state specific indicators such as vehicle miles traveled.

A summary table which shows the growth factors for each SCC category and the indicators and raw data for those growth factors is included as Attachment 5.

**Population**

Projected population is the most appropriate growth indicator to use for certain source categories whose emissions are calculated using population such as architectural coatings, consumer products and graphic arts.

Population projection data was obtained from the New Jersey Department of Labor and Workforce Development.

The data was combined and straight line interpolation was used to calculate population for the projection years. Statewide growth factors were then calculated using the following equations:

2017-2020 Growth Factor =
2017 Statewide Population / 2011 Statewide Population

2017-2020 Growth Rate (percent per year) =
{[(2017-2020 Growth Factor)^1/y] – 1} * 100 percent

Where:y = the # of years being analyzed (ex: y = 2020-2017 = 3)

A summary table of the population data is included in Attachment 5.

**Fuel Consumption**

Projected fuel consumption data was obtained from the USDOE Energy Information Administration (EIA), Annual Energy Outlook Report. The growth factors were calculated in the same manner as the population growth factors, using the same equations, but substituting projected fuel consumption for projected population. A summary table of the fuel consumption data is included in Attachment 5.

**Employment**

Projected employment is the most appropriate growth indicator to use for certain source categories whose emissions are calculated using employment such as autobody refinishing and dry cleaning.

Projected employment data was obtained from the New Jersey Department of Labor website.[6] The growth factors were calculated in the same manner as the population growth factors, using

[6] NJ Employment: Statewide Industry and Occupational Projections Tables 2016-2026, released October 2018, accesed on 2/28/19 from: https://nj.gov/labor/lpa/employ/indoccpj/indoccpj_index.html

the same equations, but substituting projected employment for projected population. A summary table of the employment data is included in Attachment 5.

**Residential Wood Combustion**

Growth and control of the residential wood combustion is incorporated into one factor, per the USEPA 2011-based V6.3 Modeling Platform[7]. The factors account for the USEPA rule that sets new source performance standard (NSPS) for woodstoves. The factors are based on estimated turnover of the old stoves to the new stoves. There were three residential wood categories that were kept flat because of the uncertainties with EPA's growth factors and the status of the controls for these categories. These categories are: non-EPA certified indoor pellet-fired furnaces, indoor hydronic heaters, and pellet-fired hydronic heaters. The estimated combined growth and control rates are the same as those used in USEPA's modeling platform and are included in Attachment 5.

**Refueling**

VOC emissions from refueling of gasoline (SCC 2201000062), diesel (SCC 2202000062) and ethanol (E85) (SCC 2205000062) were estimated in the onroad inventory. These SCCs were removed from New Jersey's 2017 onroad inventory and added to the 2017 area source inventory.

**Agricultural VOC**

Growth factors for the agricultural VOC categories were developed using the USEPA Greenhouse Gas Tool.[8] The growth factors and raw data for these categories are included in Attachment 5.

**Breweries**

Updated growth data for New Jersey's breweries was obtained from Forbes.[9]

**No Growth**

No growth was projected for the area source categories included in Table 3.

**Table 3**
**Area Source Categories with No Growth from 2017-2020**

| SCC | Description | Pollutant |
|---|---|---|
| 2102008000 | Stationary Fuel Comb /Industrial /Wood /Total: All Boiler Types | VOC, NOx, CO |
| 2103008000 | Stationary Fuel Comb /Commercial/Institutional /Wood /Total: All Boiler Types | VOC, NOx, CO |
| 2104008530 | Furnace: Indoor, pellet -fired, non-EPA certified | VOC, NOx, CO |

[7] U.S. Environmental Protection Agency. *Technical Support Document (TSD) Preparation of Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform*. August 2016.
[8] USEPA Greenhouse Gas Tool New Jersey animal counts 2/13/19
[9] NJ Brewery Growth: https://www.forbes.com/sites/garystoller/2019/01/08/guess-which-states-had-most-craft-brewery-growth-its-not-the-ones-youd-expect/#6a2c4adf41b3

| SCC | Description | Pollutant |
|---|---|---|
| 2104008620 | Hydronic heater: indoor | VOC, NOx, CO |
| 2104008630 | Hydronic heater: pellet fired | VOC, NOx, CO |
| 2302070010 | Food & Kindred Products /Fermentation/Beverages /Distilleries | VOC |
| 2401008000 | Traffic Paint | VOC |
| 2401070000 | Surface Coating /Motor Vehicles /Total: All Solvent Types | VOC |
| 2461020000 | Misc Non-industrial: Commercial /Asphalt Application: All Processes /Total: All Solvent Types | VOC |
| 2461021000 | Misc Non-industrial: Commercial /Cutback Asphalt /Total: All Solvent Types | VOC |
| 2461022000 | Misc Non-industrial: Commercial /Emulsified Asphalt /Total: All Solvent Types | VOC |
| 2461023000 | Misc Non-industrial: Commercial /Asphalt Roofing /Total: All Solvent Types | VOC |
| 2601000000 | On-site Incineration /All Categories /Total | VOC, NOx, CO |
| 2601010000 | On-site Incineration /Industrial /Total | VOC, NOx, CO |
| 2601020000 | On-site Incineration /Commercial/Institutional /Total | VOC, NOx, CO |
| 2610000100 | Open Burning /All Categories /Yard Waste - Leaf Species Unspecified | VOC, NOx, CO |
| 2610000400 | Open Burning /All Categories /Yard Waste - Brush Species Unspecified | VOC, NOx, CO |
| 2610030000 | Open Burning /Residential /Household Waste (use 26-10-000-xxx for Yard Wastes) | VOC, NOx, CO |
| 2620030000 | Waste Disposal /Treatment /Recovery /Landfills; Municipal; Total | VOC |
| 2660000000 | Leaking Underground Storage Tanks /Leaking Underground Storage Tanks /Total: All Storage Types | VOC |
| 2680003000 | Composting | VOC |
| 2801500000 | Agricultural Field Burning of Infested Matter | VOC, NOx, CO |
| 2801500170 | Agricultural Field Burning of Herbacous Matter | VOC, NOx, CO |
| 2801500300 | Agricultural Field Burning of Orchards | VOC, NOx, CO |
| 2801500600 | Agricultural Field Burning- Land Clearing | VOC, NOx, CO |
| 2810003000 | Cigarette Smoke /Total | VOC, NOx, CO |
| 2810030000 | Structural Fires | VOC, NOx, CO |
| 2810050000 | Motor Vehicle Fires /Unspecified | VOC, NOx, CO |

| SCC | Description | Pollutant |
|---|---|---|
| 2810060200 | Cremation /Animal | VOC, NOx, CO |

## 3.2 Controls

### Overview

New Jersey and the USEPA have developed and will develop rules that require control measures to reduce area source emissions of air pollutants. In developing the 2017 emissions inventory, control efficiency factors for the NJDEP pre-2017 rules were applied to the 2017 uncontrolled emissions inventory in order to calculate the 2017 "actual" or controlled emissions inventory. In a similar fashion, control efficiency factors (CEs) reflecting post-2017 rules, relative to existing rules, were applied to the grown emissions inventories, and emission reduction benefits were calculated. The CEs were applied to the grown inventory, to determine emission reduction benefits from the New Jersey rules, relative to the existing rules. These benefits grow in future years in direct relation to the growth factor for the respective emission categories. The equation that was used to project emissions in a future year, y, incorporating growth and the application of new control measures between year x and year y is:

E y = E x * GFx-y * [1 - (CE * RE * RP)x-y]

where: Ey = Controlled emissions in year y
Ex = Controlled emissions in year x
GFx-y = Growth factor used to grow emissions from year x to year y
CE = Control efficiency factor for a control measure implemented between years X and Y
RE = Rule Effectiveness Factor
RP = Rule Penetration Factor
CF=Control Factor = [1 - (CE * RE * RP)x-y]

The control factors (CF) applied to the 2020 inventory are shown in the area source emission inventory in Attachment 6. The 2017 emission inventory was used as a base for the projection inventory. The existing control measures which reduce area source emissions for VOC and $NO_x$ in the projection inventory from 2017 to 2020 are shown in Table 4.

**Table 4**
**Area Source VOC and $NO_x$ Control Measures**

| Control Measures | Sector | Pollutant | Area Source Category |
|---|---|---|---|
| New Jersey Portable Fuel Containers | Area | VOC | Residential Portable Gas Cans |
| Federal Residential Woodstove New Source Performance Standards (NSPS) | Area | VOC, $NO_x$ | Fireplaces, Fireplace Inserts, Freestanding Woodstoves, Pellet Stoves, Indoor Furnaces, Outdoor Hydronic Heaters, Outdoor Wood-Burning Devices, and Firelogs *add note about the three SCCs that were kept flat because of EPA uncertainty. Can be a footnote. |

| Control Measures | Sector | Pollutant | Area Source Category |
|---|---|---|---|
| RICE MACT | Point and Area | | Industrial Distillate Engines, Commercial Distillate Engines |

A discussion of the control measure control factors is included below. The control factors used in the inventory are included in Attachment 6.

**Control Factors**

**Portable Fuel Containers**

New Jersey adopted amendments to its rule limiting VOC emissions from portable fuel containers (PFCs) on December 1, 2008. The rule requires that PFCs and/or spouts have a permeability mot to exceed 0.4 grams/gallon/day, be equipped with an automatic shut-off device and an automatic device that closes and seals when it is removed from the fuel tank. The rule also requires that a PFC have a fuel flow rate and fill level standards.

The rule applies to new containers, and thus the anticipated reductions depend on the turnover of older non-compliant containers to new, lower-emitting containers. The emission reduction calculations assume a 10-year turnover period. Emission reduction percentage were calculated by CSRA International, Inc. for each year. New Jersey used the spreadsheet tool to calculate an interpolated control factor for 2017 to 2020.

**Residential Woodstove NSPS**

As discussed above, the estimated combined growth and control rates are the same as those used in USEPA 2011-based V6.3 Modeling Platform[10]. These growth and control rates are included in Attachment 5. There were three residential wood categories that were kept flat because of the uncertainties with EPA's growth factors and the status of the controls for these categories. These categories are: non-EPA certified indoor pellet-fired furnaces, indoor hydronic heaters, and pellet-fired hydronic heaters.

**RICE MACT**

USEPA developed control factors for three NESHAP rulemakings for RICE. These rules reduce HAPs from existing and new RICE sources. In order to meet the standards, existing sources with certain types of engines will need to install controls. These rules apply to Industrial Distillate Engines and Commercial Distillate Engines and went into effect January 2017. These controls were not applied to the base inventory, so controls were applied to the 2020 projection. The percent reductions are based on the USEPA 2011-based V6.3 Modeling Platform[11] and can be found in Attachment 5.

## 3.3 Area Source Emission Inventory

[10] U.S. Environmental Protection Agency. *Technical Support Document (TSD) Preparation of Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform*. August 2016.
[11] U.S. Environmental Protection Agency. *Technical Support Document (TSD) Preparation of Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform*. August 2016.

Table 5 summarizes the 2020 projected area source emission inventory by county for VOC, $NO_x$ and CO. Attachment 6 contains the detailed area source emission inventories. These attachments are only available electronically.

**Table 5**
**2020 Area Source Emission Inventory by County and Pollutant**

| County | VOC Summer Tons Per Day | $NO_x$ Summer Tons per Day | CO Summer Tons per Day |
|---|---|---|---|
| **New Jersey Portion of Northern NJ-NY-CT NAA** | | | |
| Bergen | 24.34 | 2.89 | 4.05 |
| Essex | 18.20 | 2.30 | 3.01 |
| Hudson | 15.90 | 1.84 | 2.19 |
| Hunterdon | 4.03 | 0.39 | 1.20 |
| Middlesex | 22.96 | 2.60 | 3.51 |
| Monmouth | 16.72 | 1.87 | 3.01 |
| Morris | 14.30 | 1.80 | 3.04 |
| Passaic | 12.29 | 1.27 | 1.81 |
| Somerset | 9.68 | 1.19 | 1.85 |
| Sussex | 3.91 | 0.41 | 1.46 |
| Union | 14.18 | 1.51 | 2.12 |
| Warren | 3.30 | 0.30 | 0.98 |
| **Total** | **159.81** | **18.37** | **28.24** |

**Overall Emissions Summary**

The overall growth rate (with growth and controls) for area sources in the New Jersey portion of the Northern New Jersey-New York-Connecticut nonattainment area from 2017 to 2020 is approximately 0.61% per year for VOC, 0.45% per year for $NO_x$, and 0.36% per year for CO. The nonattainment area average growth rates from 2017 to 2020 vary within the individual SCC categories and pollutants from approximately negative 15.41 percent per year for residential non-EPA certified cordwood-fired indoor furnaces for all three pollutants to 10.76 percent per year for industrial liquefied petroleum gas for all three pollutants.

The growth rates for all of the SCCs in the 2017-2020 projection inventory are included in Attachment 5.

**VOC Emissions Summary**

Overall, the VOC categories showing the most negative growth (largest decreases) from 2017-2020 are non-EPA certified indoor cordwood fired furnaces, residential kerosene combustion, residential liquefied petroleum gas combustion, industrial and commercial residual oil combustion, waste emissions from beef cattle and horses, and residential distillate oil combustion. The growth for these categories ranges from negative 11.65 percent to negative 39.67 percent from 2017-2020.

Overall, the VOC categories showing the largest increases from 2017 to 2020 are industrial liquefied petroleum gas combustion, breweries, marine vessel kerosene transport, pipeline gasoline transport, truck gasoline transport, marine vessel gasoline transport, gasoline service stations tank breathing and emptying, and spillage from gasoline and ethanol (E85) refueling. The growth for these categories ranges from 12.96 percent to 35.87 percent from 2017-2020.

**NOx Emissions Summary**

Overall, the NOx categories showing the most negative growth (largest decreases) from 2017 to 2020 are non-EPA certified indoor cordwood fired furnaces, residential kerosene combustion, residential liquefied petroleum gas combustion, industrial and commercial residual oil combustion, and residential distillate oil combustion. The growth for these categories ranges from negative 11.65 percent to negative 39.67 percent from 2017-2020.

Overall, the NOx category showing the largest increase from 2017 to 2020 is industrial liquefied petroleum gas combustion with 35.87 percent growth from 2017-2020. All other NOx categories show growth of 9.21 percent or less from 2017 to 2020.

**CO Emissions Summary**

Overall, the CO categories showing the most negative growth (largest decreases) from 2017 to 2020 are non-EPA certified indoor cordwood fired furnaces, residential kerosene combustion, residential liquefied petroleum gas combustion, industrial and commercial residual oil combustion, and residential distillate oil combustion. The growth for these categories ranges from negative 11.65 percent to negative 39.67 percent from 2017-2020.

Overall, the CO category showing the largest increase from 2017 to 2020 is industrial liquefied petroleum gas combustion with 35.87 percent growth from 2017-2020. All other CO categories show growth of 9.21 percent or less from 2017 to 2020.