Projections of Future Oil & Gas Emissions

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Oil & Gas Projections Background

• Prior to 2011 NEI, not much, but not much of an inventory either!
Like most of non-EGU sources, no projections (growth or control) for oil and gas sources prior to 2011 NEI-based platform (2011v6), with notable exceptions:

- Select WRAP basins: mid-term projections to year 2010, 2012 or 2015 used for all subsequent years
- Texas year-specific oil drilling-related estimates through year 2021
Oil & Gas Projections: 2011 Platform Overview

• General outreach: Public release prior to proposed or final rulemakings (e.g., Transport Rule, Ozone NAAQS)
  • Numerous comments targeting most emissions sources
  • Oil & Gas-specific comments (discussed later)
• Oil and Gas approach for initial 2011 emissions (2011 NEI v1) modeling platform (2011v6)
  • Collaboration with Economics group (AEG) and Office of Atmospheric Programs (OAP) Climate Change Division (CCD)
  • Source Category-Based (SCC) approach
• Modeling approach documented in (Section 4.2.4) 2011v6 Technical Support Document (TSD):
Oil & Gas Projections: Existing (2011v6) Platform Specifics

• Based on estimated Annual Energy Outlook (AEO) 2013 regional 2011-2018 growth factors
  • Oil production, natural gas production, and combined oil & natural gas activities (summed o&g production levels barrel-of-oil equivalents, 0.178 bbl crude oil = 1,000 ft³ natural gas)
  • EIA (Energy Information Administration) county-NEMS (National Energy Modeling System) region cross-walk

• SCCs impacted by NSPS verified w/ EPA SPPD & OAP/CCD:
  • Reduction factors estimated from the U.S. Climate Action Report specify year of report
  • Assumed NSPS impacts VOC only and reduces increases only (new activities in the future)
  • However, natural gas well completion-related activities are “one-shot”, so all emissions reduced, not just “growth”
Oil & Gas Projections (cont.)

• Net growth rates computed from AEO growth + NSPS controls (VOC only) + other assumptions:
  • No replacement of capital via NSPS, only affects growth
  • Emissions change linearly with production level changes
  • Engine-related regulatory impacts (RICE NESHAP) calculated separately
Known Limitations in Existing Platform

• Geographic specificity
  • Using NEMS regions rather than basin/state-specific growth factors
  • Control information national, no state rules

• Use of 2013 AEO factors
  • Draft 2014 AEO factors just released and much larger than 2013 factors
  • Application to all oil & gas SCCs rather than refined approach: many sources do not scale as production (known limitation)

• Application to inventory/modeling
  • By-SCC approach rather than NAICS/SCC
  • Speciation, temporalization and spatial allocations are the same as base year
Oil & Gas NEMS Regions

Existing Oil & Gas VOC Projection Estimates**

** does not include RICE NESHAP
Moving Forward: 2011v6.2 Oil & Gas Projections

• Replace AEO-2013 with AEO-2014 growth factors
• Utilize NAICS/SCC sector construct rather than SCC
• Utilize 2011 NEI v2
  • Significant changes to 2011 estimates, some via states, but also numerous modifications to the Oil & Gas Tool inputs
  • New emissions sources included (e.g., coal-bed methane)
  • Comments from 2011 emissions modeling platform considered
• Emissions Modeling updated spatial surrogates
Comments Under Review for 2011v6.2 Oil & Gas Projections

• Numerous comments from 2018 emissions modeling platform being evaluated:
  • Using NEMS-region AEO growth not acceptable
  • Where provided/available, basin/state-specific information being digested
  • Specific processes (SCCs) should not have been projected via AEO factors

• Evaluating state-specific comments
  • Should comments for a particular state apply to all states? All states in basin of interest?
  • Comments specific to year 2018. What about 2025? 2030?
  • New projections needed very soon: need to balance best-available information with project needs
2018 AEO Projections: 2013 vs Draft 2014

Oil Production

Natural Gas Production

Growth Rate

Northeast | Gulf Coast | Midcontinent | Southwest | Rocky Mountains | West Coast | Northeast | Gulf Coast | Midcontinent | Southwest | Rocky Mountains | West Coast

- AEO 2013 to 2018
- AEO Draft 2014 to 2018
2025 AEO Projections: 2013 vs Draft 2014

Oil Production

Natural Gas Production

Growth Rate

Northeast  Gulf Coast  Midcontinent  Southwest  Rocky Mountains  West Coast  Northeast  Gulf Coast  Midcontinent  Southwest  Rocky Mountains  West Coast

AEO 2013 to 2025  AEO Draft 2014 to 2025
Other updates for upcoming platform update

• Controls
  • Inclusion of IC engines NSPS and NESHAP recalculation

• State comments, examples:
  • no-growth in NY through 2018
  • PA county-level variation (9x increase in gas production between 2011 and 2012 in Wyoming county)
  • PA source variation, significant increase in compressors but lesser increase for drilling rigs

• Growth, basin-specific for several Shale Gas and Tight Oil Plays
  • Shale Gas: Antrim, Bakken, Barnett, Eagle Ford, Fayetteville, Haynesville/Bossier and Marcellus
  • Tight Oil: Austin Chalk, Avalon/Bone Springs, Bakken, Eagle Ford, Monterey, Niobrara, Sprayberry, Wolfcamp and Woodford