

Projections of Future Oil & Gas Emissions

EPA/States Oil and Gas Emissions Summit

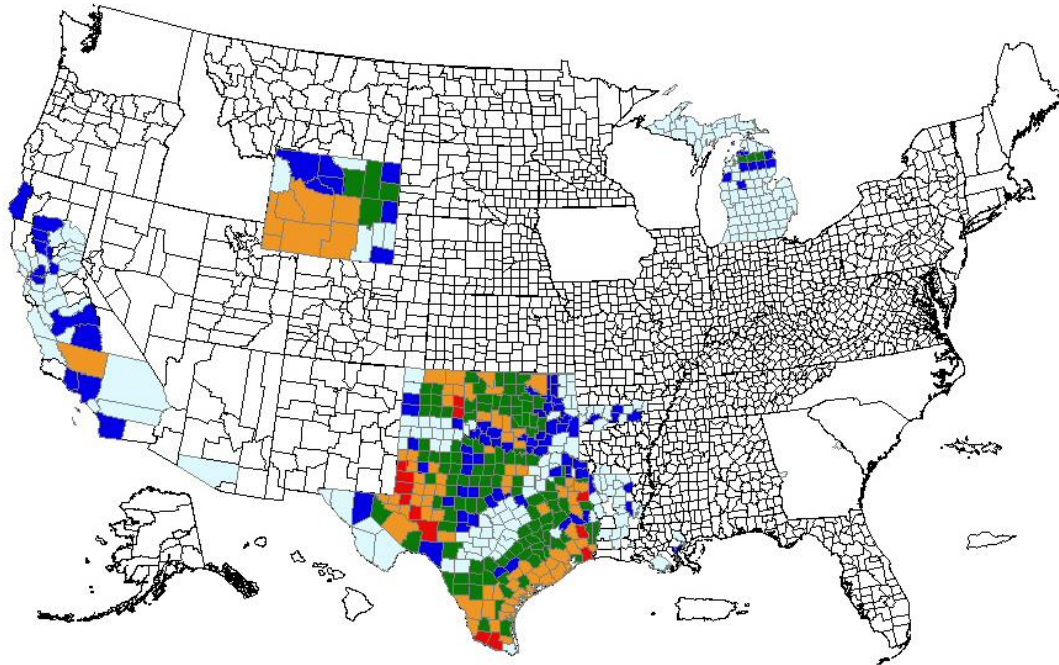
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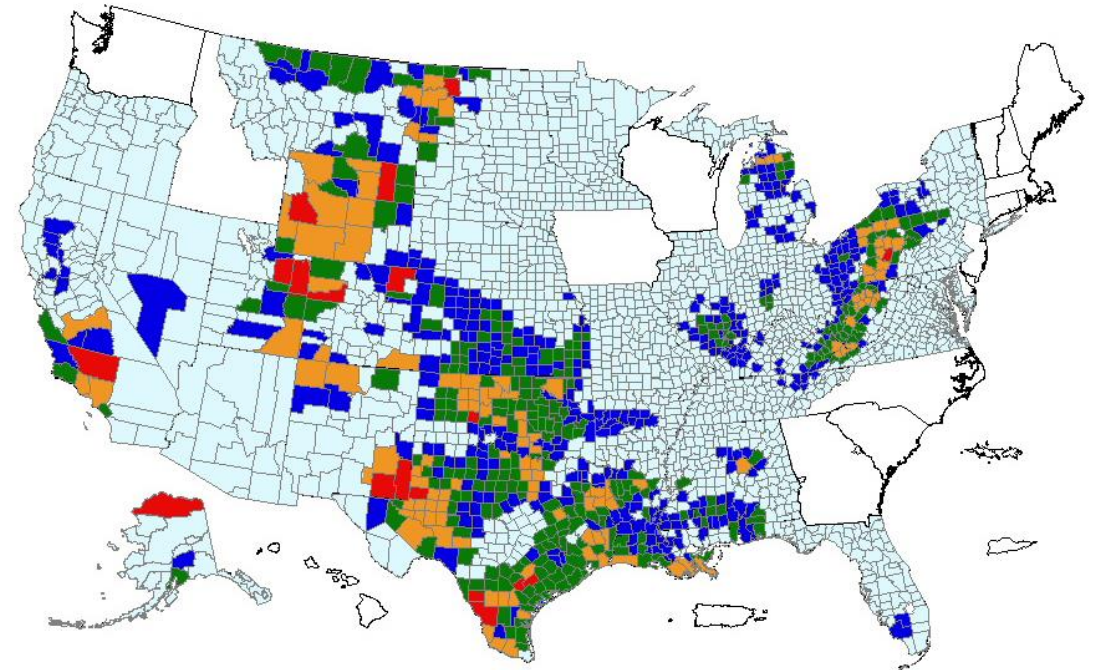
Oil & Gas Projections Background

- Prior to 2011 NEI, not much, but not much of an inventory either!

2008 NEI



2011 NEI (v1.4)



Oil & Gas Projections Background (cont.)

- 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):
 - http://www.epa.gov/ttn/chief/emch/2011v6/outreach/2011v6_2018base_EmisMod_TSD_26feb2014.pdf

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”

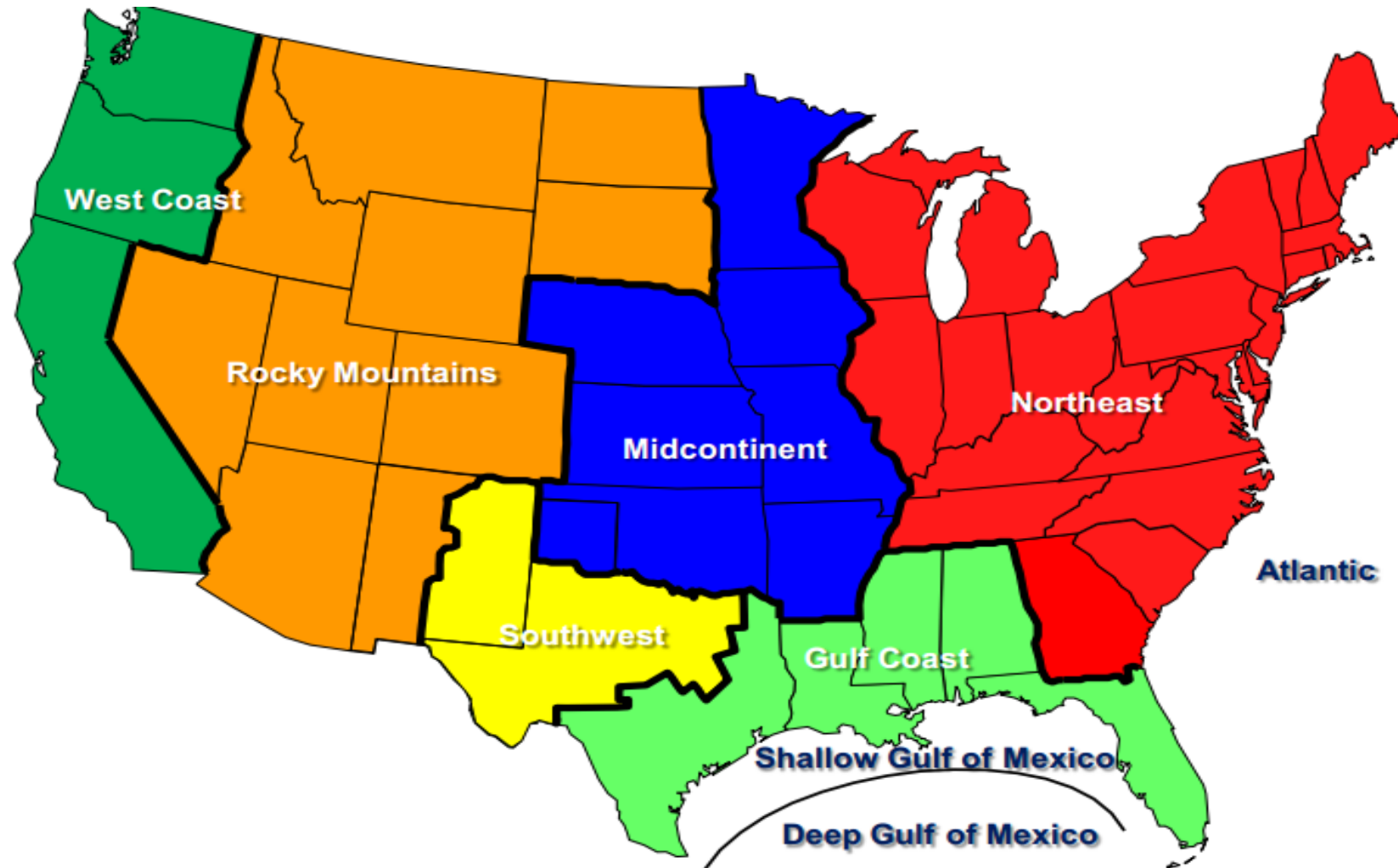
Oil & Gas Projections (cont.)

- 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

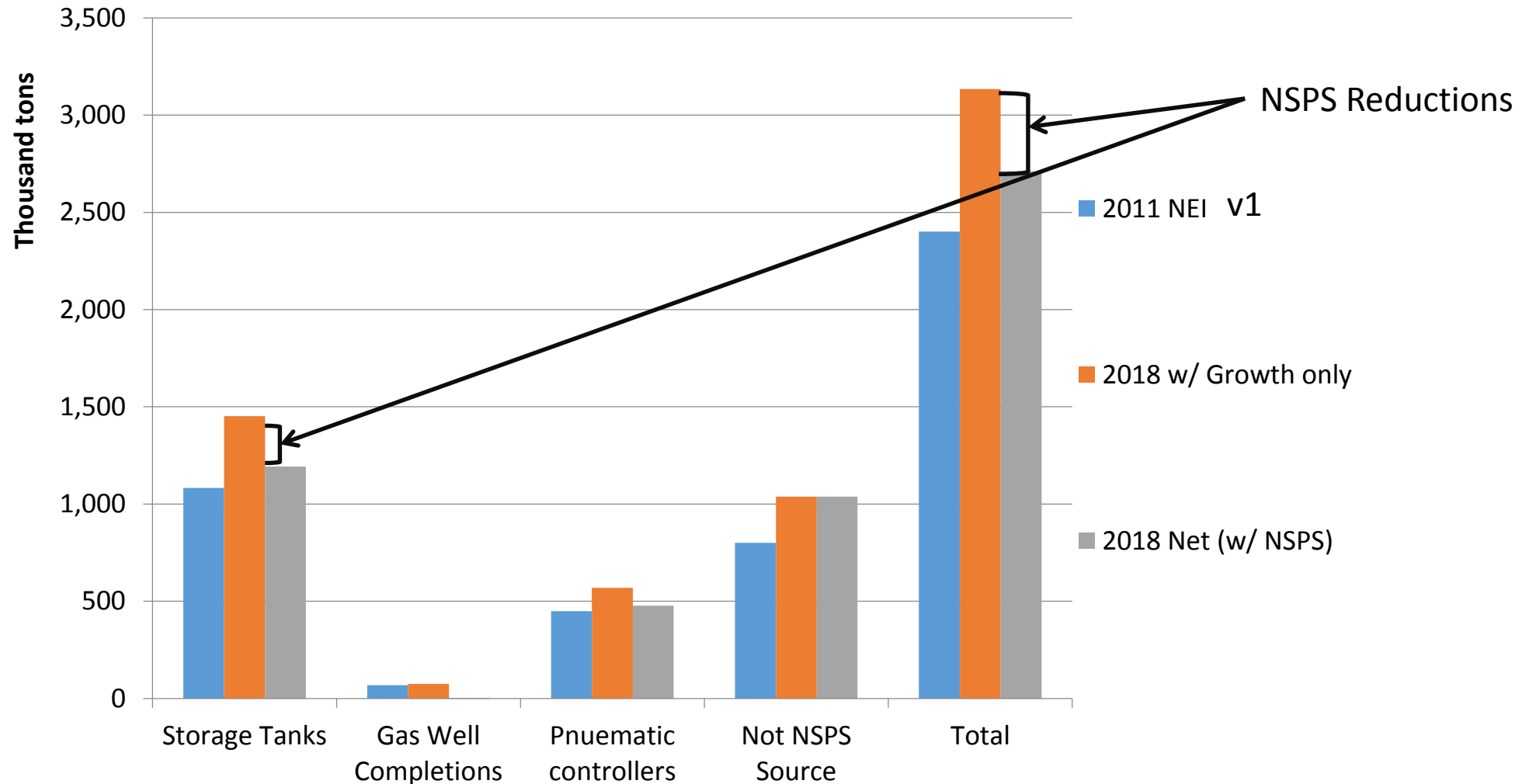
- Geographic specificity
 - Using NEMS regions rather than basin/state-specific growth factors
 - Control information national, no state rules
- Use of 2013 AEO factors
 - Draft 2014 AEO factors just released and much larger than 2013 factors
 - Application to all oil & gas SCCs rather than refined approach: 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



Source: U.S. Energy Information Administration, Office of Energy Analysis.

Existing Oil & Gas VOC Projection Estimates**



** does not include RICE NESHAP

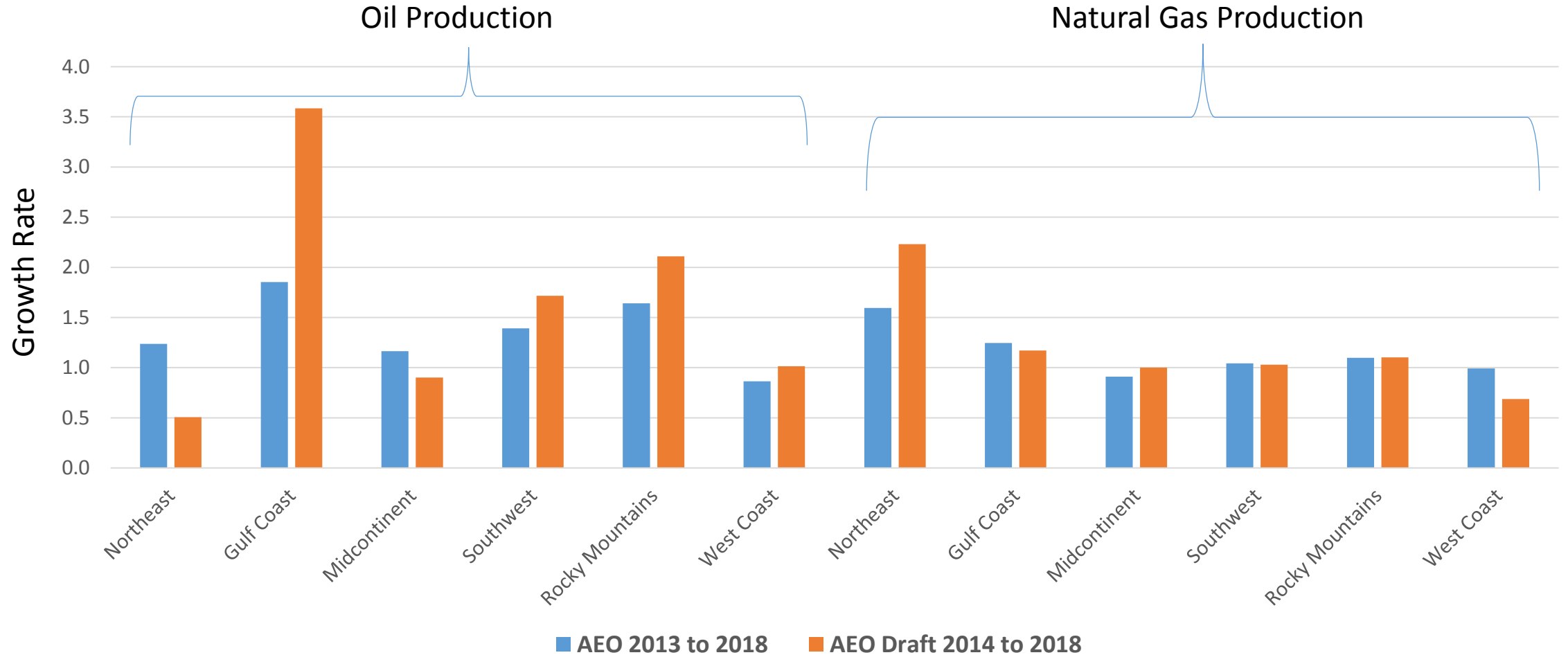
Moving Forward: 2011v6.2 Oil & Gas Projections

- 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

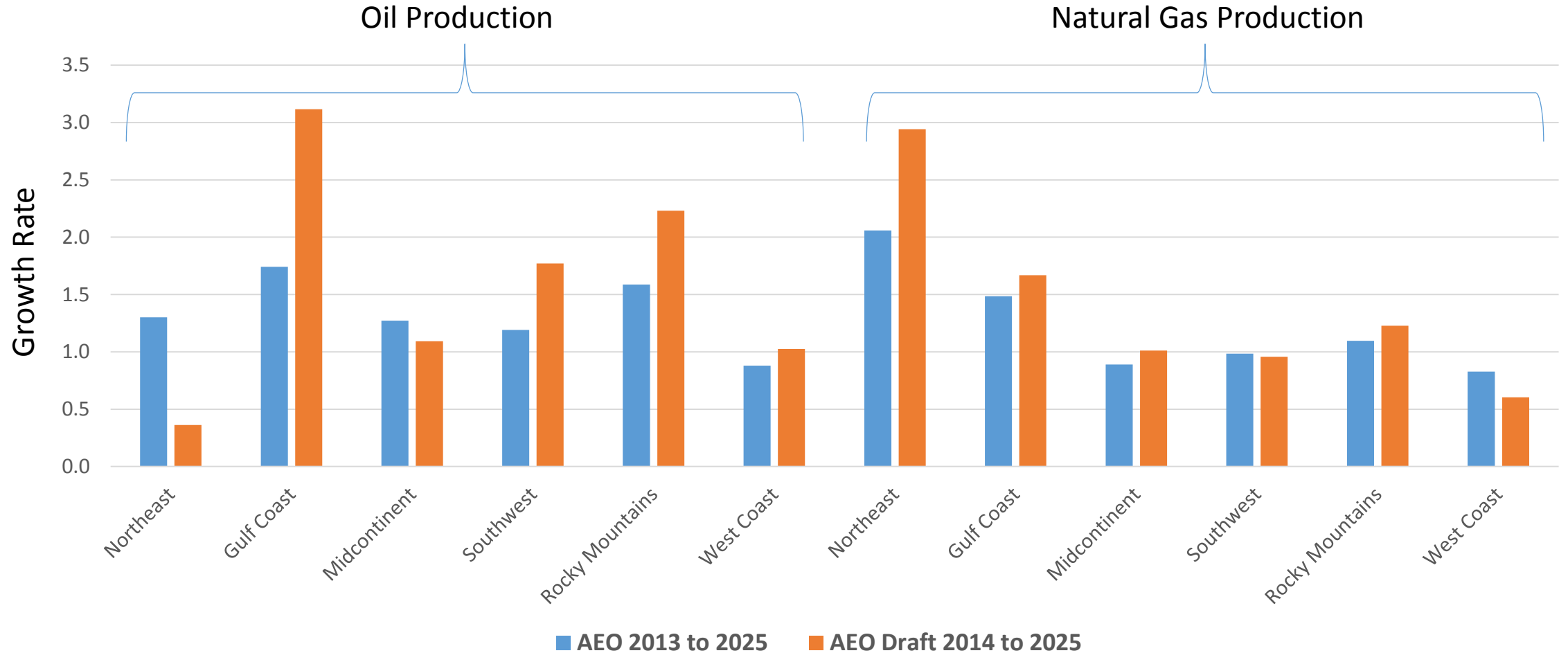
Comments Under Review for 2011v6.2 Oil & Gas Projections

- 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



2025 AEO Projections: 2013 vs Draft 2014



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