

EPA Base Case v.5.14 Using IPM[®]

Clean Air Markets Division
March 25, 2015



What's New in EPA Base Case v.5.14 Using IPM

- ▶ Routine update with no structural or major data updates (relative to v.5.13).
 - ▶ Retained: run years, costs and prices, model regions, fuel price assumptions, financial assumptions, unit level availability, capacity factor and O&M cost assumptions, transmission assumptions
- ▶ Electricity demand projections are based on AEO 2014
- ▶ **NEEDS:** Nearly 8,000 unit level comments obtained by EPA through 2011 and 2018 platform NODAs and other avenues. These are reviewed and implemented as they fit our criteria.
 - ▶ Committed units with online year of 2015 or earlier were reviewed and updated
 - ▶ Nuclear unit capacity and projected up rates are based on AEO 2014.
 - ▶ Retirement related information from NEEDS comments, EPA research and ICF research was reviewed and incorporated.
- ▶ **Model Plant Aggregation revised to reflect on the books rules appropriately:** BART, Section 316 (b) and CCR, tangential, wall and cell fired units for coal steam and oil/gas steam units; wet and dry bottom units for coal steam and oil/gas steam units; coal units that were operating and not operating their SCR's in 2011.
- ▶ The online year for new units are revised
- ▶ RPS targets revised based on AEO 2014
- ▶ We have prevented immediate retirement of hardwired C2G retrofitted units based on a ramp rate.
- ▶ Updates in retrofits based on comments
 - ▶ We have also identified 27 units with SCRs where we have adopted most recent (2014) NOx rates, as these units were either not running their SCRs or running them with lower removal efficiency.

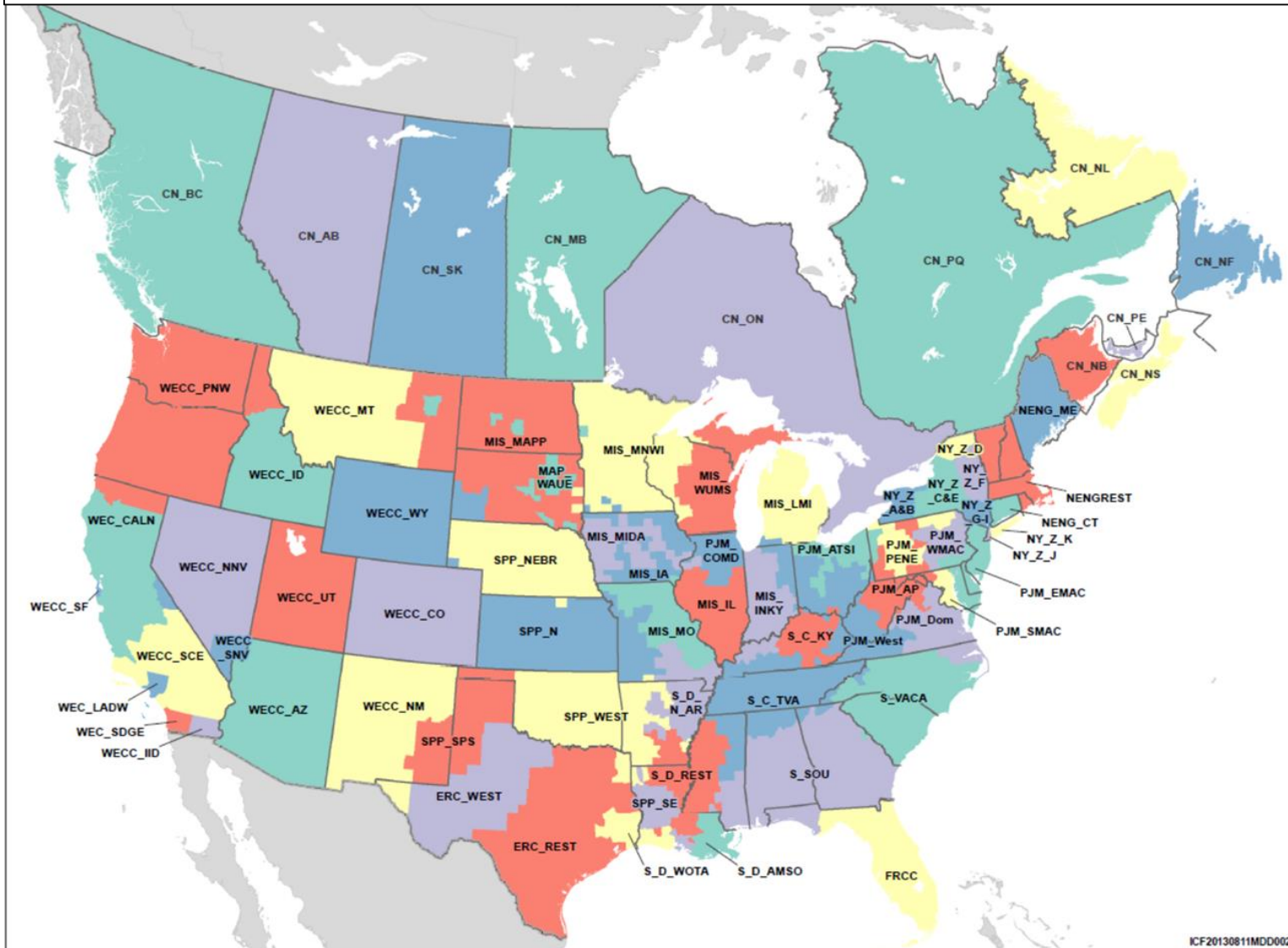
What's New in EPA Base Case v.5.14 Using IPM

▶ Environmental Regulations

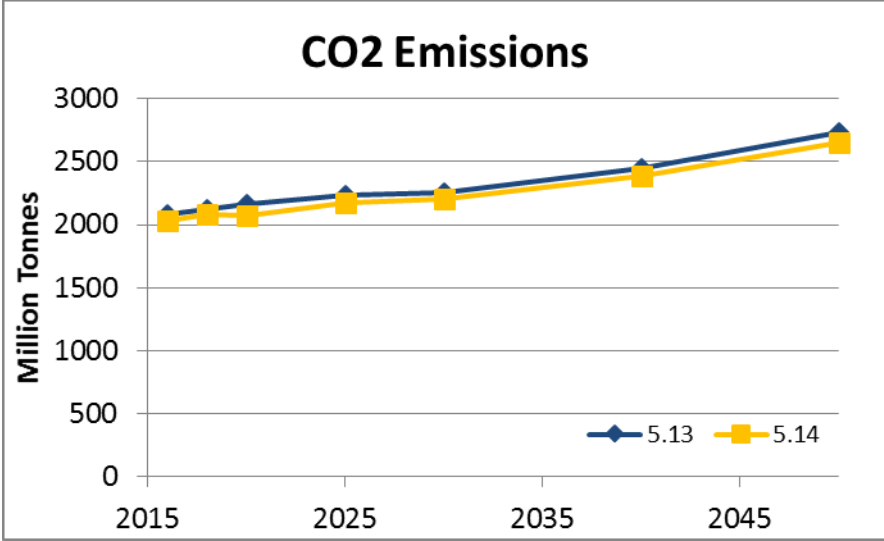
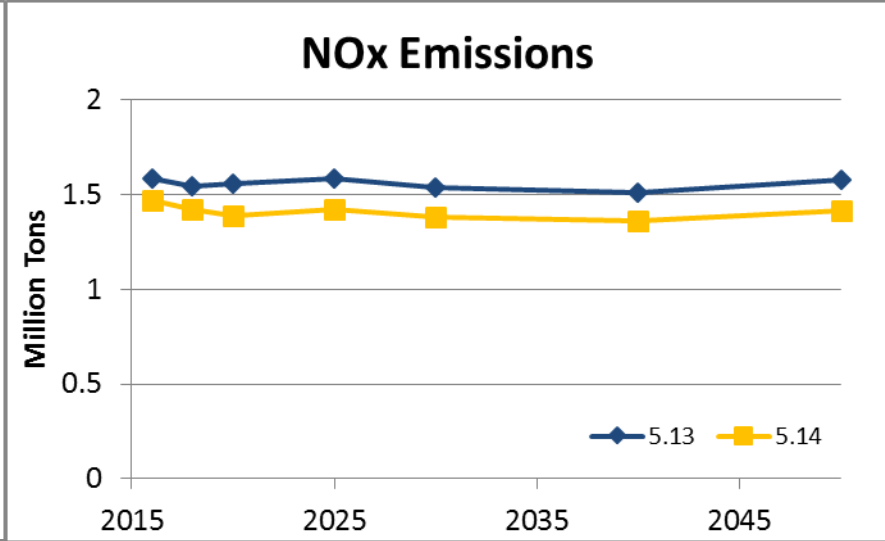
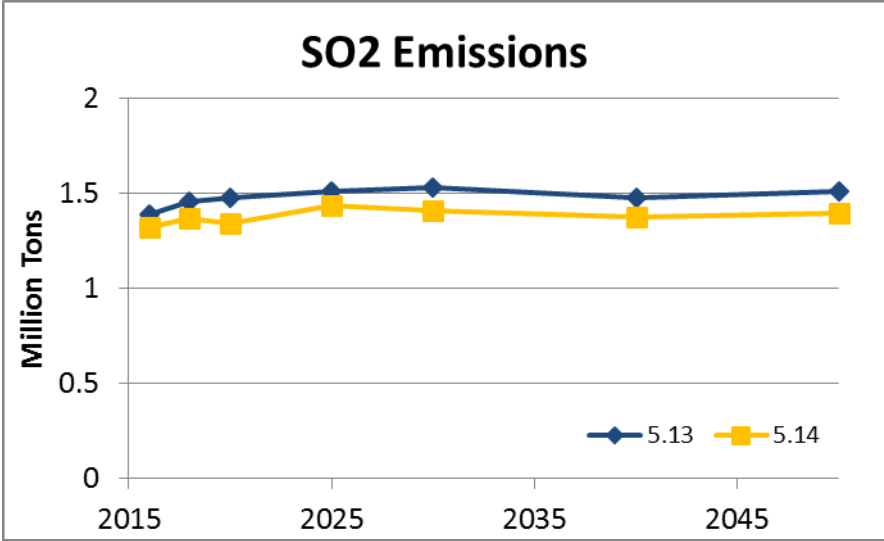
- ▶ CSAPR and MATS are modeled.
- ▶ Incorporated 316(b) and CCR rules.
- ▶ Comments provided by EPA regional offices in regards to state regulations in CA, CO and NJ are incorporated.
- ▶ The MidAmerican Energy Company and KCPL citizen suit settlements are modeled.
- ▶ Revisions to BART SO₂ and BART NO_x rate policies are now modeled.
- ▶ NSR settlements for Minnesota Power and Consumer Energy are modeled.
- ▶ California AB 32 CO₂ allowance price projections are based on AEO 2013.
 - The California AB 32 CO₂ cost adder for power imported into CA is based on the ARB default value (a simplified and more consistent approach compared to IPM v.5.13).

Regions Have Not Been Changed

EPA Base Case v.5.14 Regions

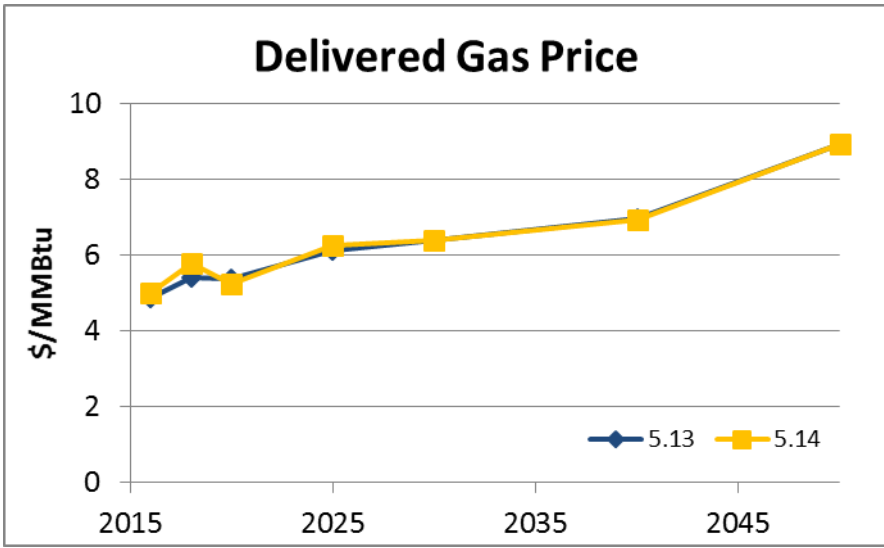


Projections: Slightly Lower Emissions

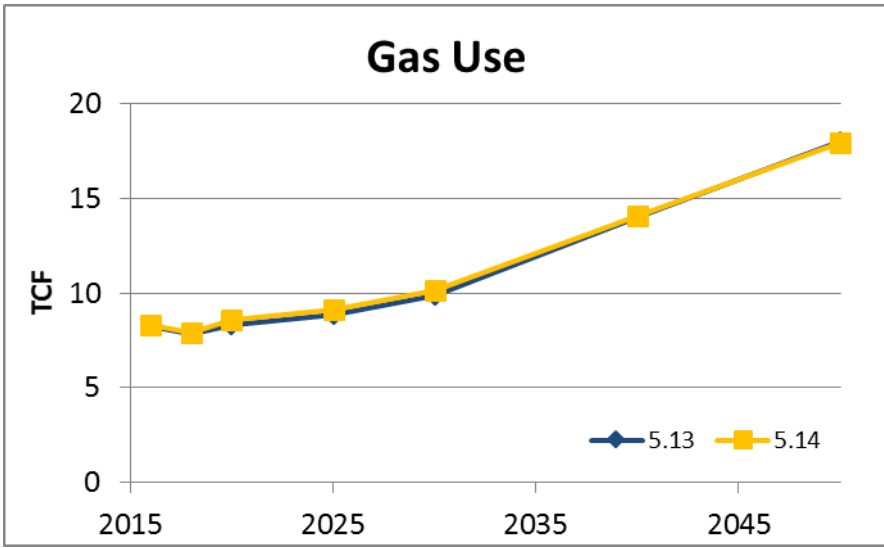


Attributable to less coal generation and slightly less demand.

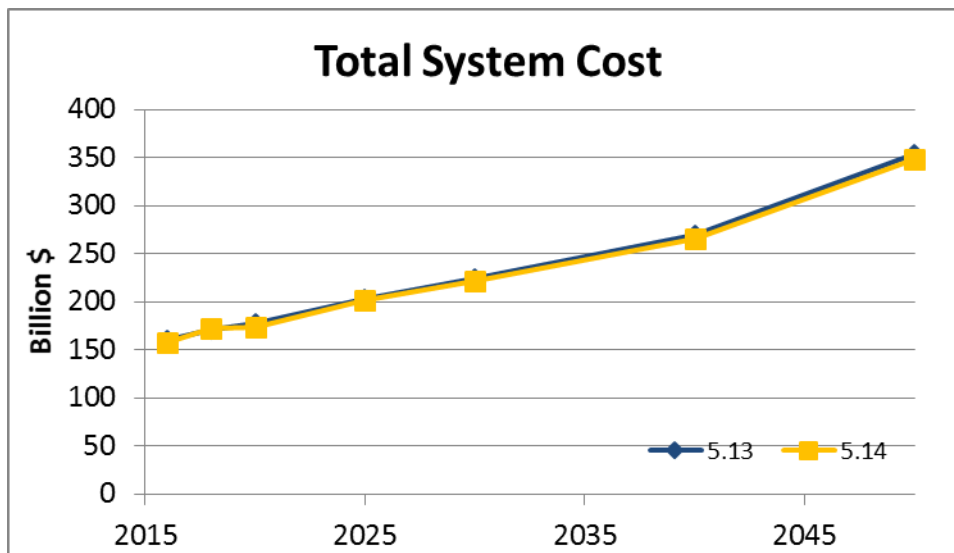
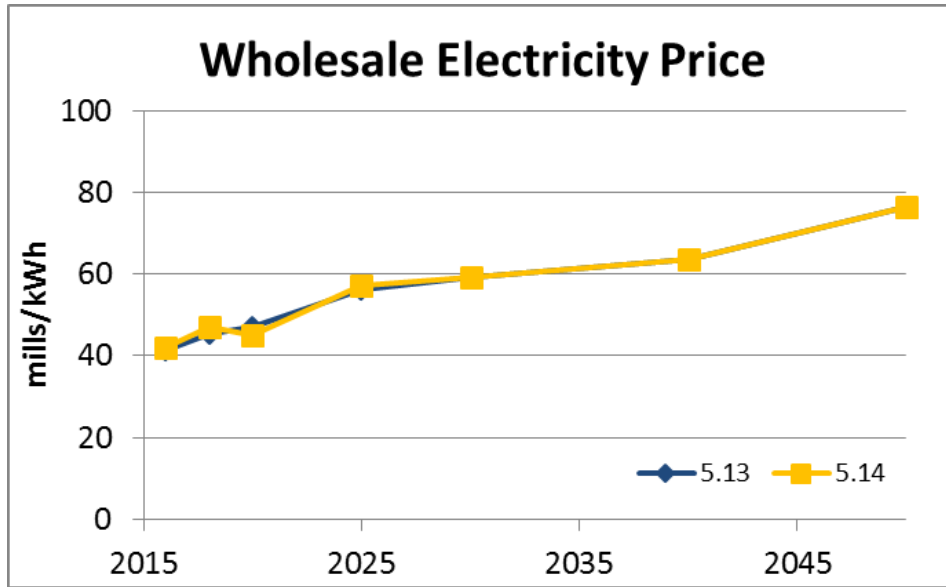
Gas Projections: Almost Identical



IPM v.5.14 uses the same gas module as IPM v.5.13.

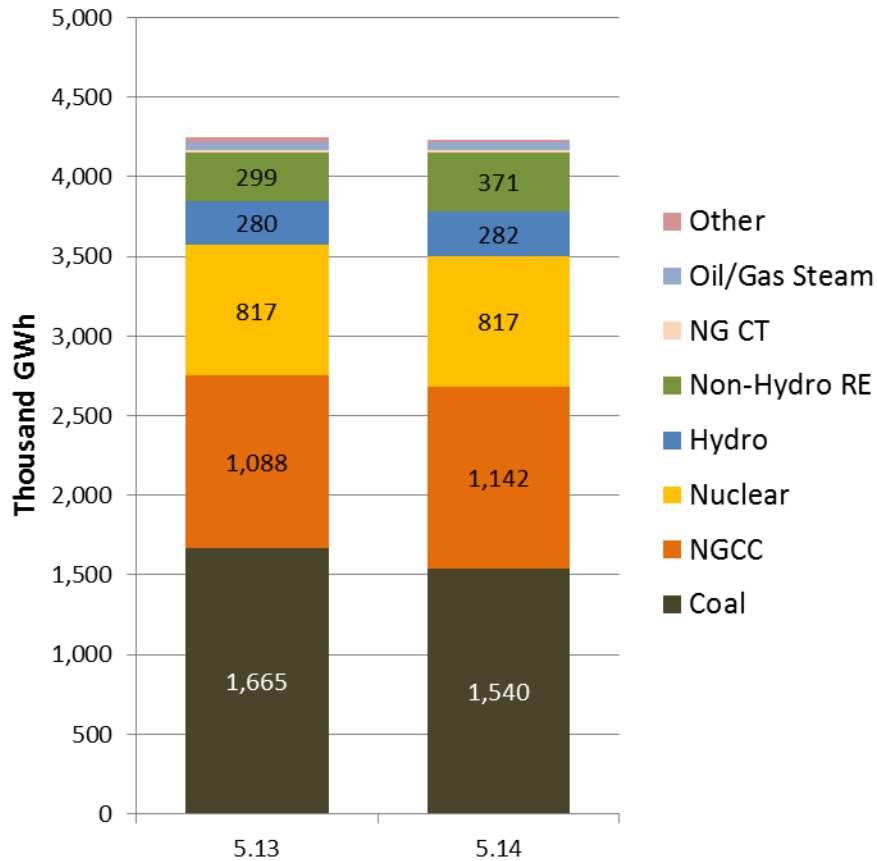


Electricity Price and System Cost Projections: Very similar

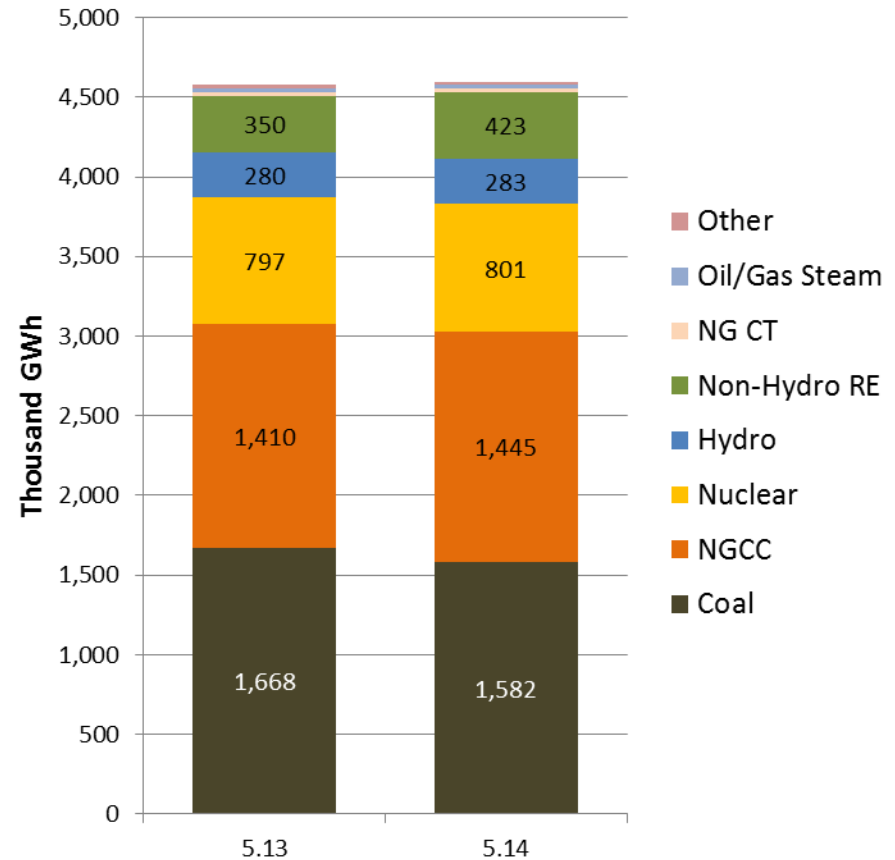


Projections: Generation Mix

2020 Generation Mix



2030 Generation Mix

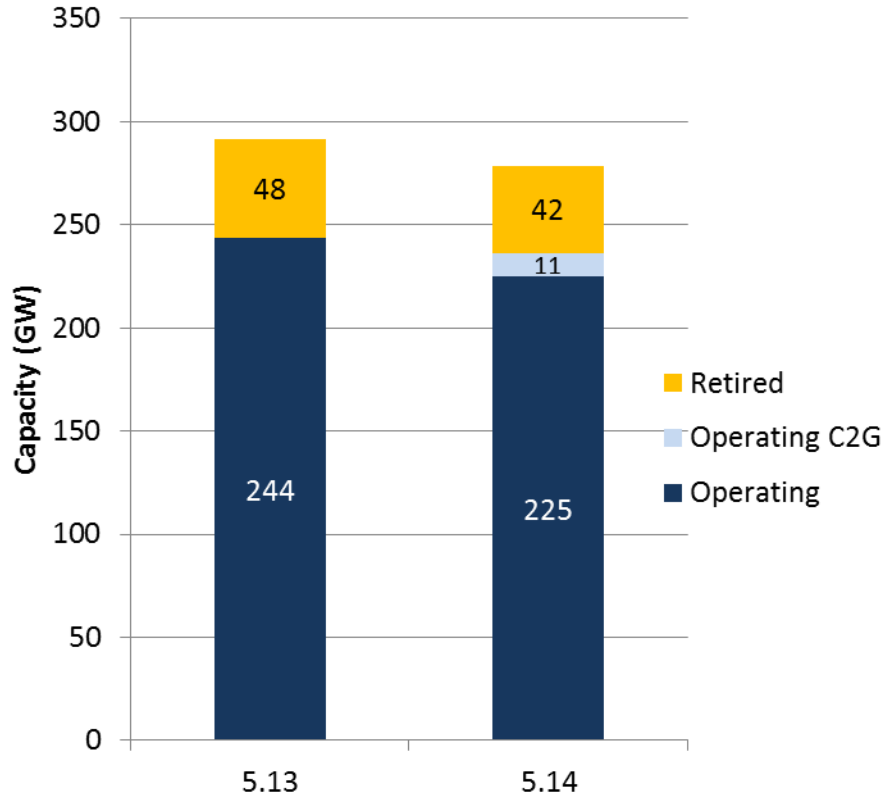


Less coal generation in IPM v.5.14 compared to v.5.13

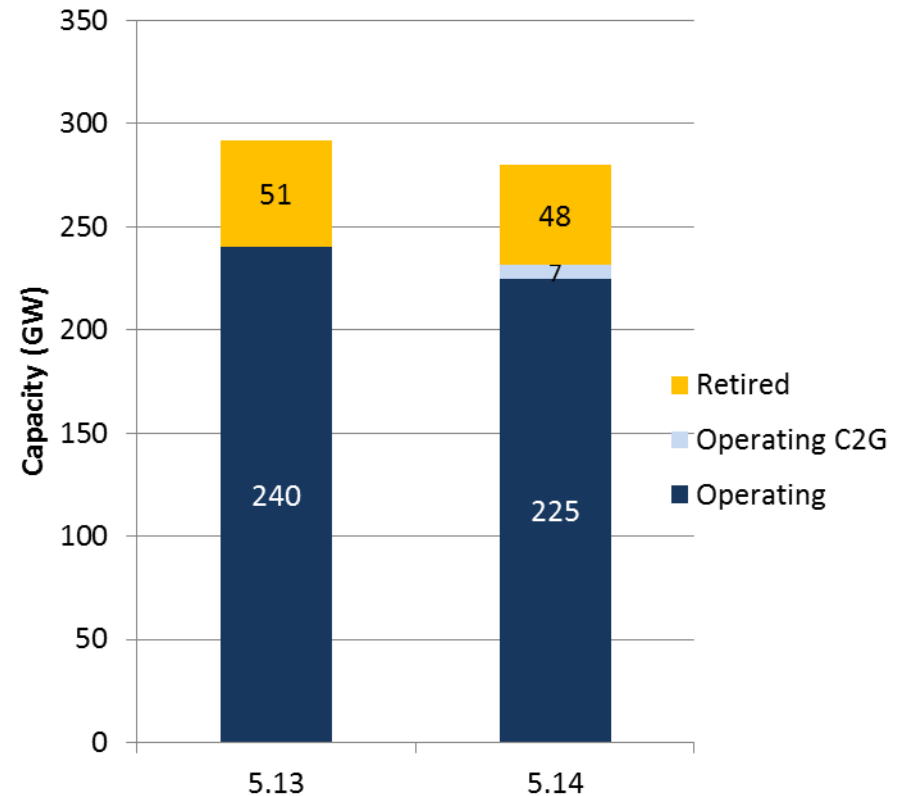
- Inclusion of coal ash and 316(b) compliance
- A larger set of coal-to-gas retrofits hardwired
- Updated NSR settlements and BART requirements

Projections: Coal Capacity and Retirements

Coal Steam Capacity 2020



Coal Steam Capacity 2030



EPA Base Case v.5.14 Results

- ▶ <http://www.epa.gov/airmarkets/>
- ▶ www.epa.gov/powersectormodeling/
- ▶ <http://www.epa.gov/airmarkets/programs/ipm/psmodel514.html>

EPA Base Case v.5.14 Incremental Documentation

► Available at www.epa.gov/powersectormodeling

Table 1-1 Updates in the EPA Base Case v.5.14

Description	For More Information	Change Type
Power System Operation		
AEO NEMS region level electricity demand is disaggregated to IPM model region level	Section 3.2	Adding information
AEO 2014 Demand Assumptions	Table 3-2, Table 3-3	Update
CSAPR, 316(b) and CCR (in addition to MATS, BART) are part of Base Case	Section 3.9.3	Update
AB 32 Regulation	Section 3.9.4	Update assumption
Updated State Power Regulations included in EPA Base Case v.5.14	Table 3-13	Update
Updated NSR Settlements included in EPA Base Case v.5.14	Table 3-14	Update
Updated State Settlements included in EPA Base Case v.5.14	Table 3-15	Update
Updated Citizen Settlements in EPA Base Case v.5.14	Table 3-16	Update
Updated BART Regulations included in EPA Base Case v.5.14	Table 3-19	Update
Updated Renewable Portfolio Standards and Solar Carve -Outs	Table 3-17	Update
Generating Resources		
Updated Data Sources for NEEDS v.5.14	Table 4-1	Update
Updated Rules Used in Populating NEEDS v.5.14	Table 4-2	Update
Updated Summary Population (Through 2012) of Existing Units in NEEDS v.5.14	Table 4-3	Update
Updated the Hierarchy of Data Sources for Capacity in NEEDS v.5.14	Table 4-4	Update
Updated Data Sources for Unit Configuration in NEEDS v.5.14	Table 4-6	Update
Updated Aggregation Profile of Model Plants	Table 4-7	Update
Updated Summary of Planned-Committed Units in NEEDS v.5.14	Table 4-11	Update
Updated Planned-Committed Units by Model Region in NEEDS v.5.14	Table 4-12	Update
Updated Nuclear Up-rating	Table 4-33	Update
Updated Characteristics of Existing Nuclear Units based on NEEDS v.5.14	Table 4-34	Update
Updated Capacity not Included based on EIA 860	Table 4-35	Update
Updated the Capacity not included due to recent announcements	Table 4-36	Update
Added Information on Variable O&M and Fixed O&M Cost Approach	Section 4.2.7	Added Information
Emission Control Technologies		
Added description of CO ₂ From FGD and DSI Systems	Section 5.1	Adding Information
Retrofit updates to reflect 2014 behavior in 27 units	Section 5.2	Adding Information
Others		
Preventing the Immediate Retirement of Hardwired C2G, Ramping	N/A	Adding Information

EPA Base Case v.5.14 Results

- ▶ **EPA Base Case v.5.14 input and output files are available at www.epa.gov/powersectormodeling**
 - ▶ Incremental Documentation
 - ▶ NEEDS 5.14
 - ▶ Incremental Update to NEEDS (a spreadsheet listing all comments we have received and what action taken) since the previous public version
 - ▶ Output Files (model outputs are for years 2016, 2018, 2020, 2025, 2030, 2040 and 2050)
 - Overview
 - System Summary Report
 - .DAT, .RPE, .RPT files
 - Gas Report
 - State Level Emissions Summary
 - Parsed File (2018 and 2025)
 - Flat File (2018 and 2025)
 - ▶ User guides

EPA Base Case v.5.14 Results

- ▶ **IPM v.5.14 input and output files are available at www.epa.gov/powersectormodeling**
- ▶ Also available is 2017 flat file for AQM and a description document. Starting with the 2018 base case results we made modifications to emissions of units in three categories.
 - **SCR Operation/Installation:** For units that had an SCR in 2018 but were assumed to not operate (or be installed) in 2017, EPA recalculated the NO_x emissions for the unit with the 2018 heat input and the 2016 emissions rate.
 - **Retirements:** For units projected to retire in 2018, emissions from the 2016 run year were included in the 2017 emissions.
 - **Coal-To-Gas:** For units that had implemented coal-to-gas retrofit options in 2018 and had not dispatched, emissions from the 2016 run year were incorporated. However, if the coal-to-gas retrofit options had dispatched in 2018, then the NO_x emissions were calculated based on the 2018 fuel use and 2016 NO_x rate.

EPA Base Case v.5.14

Please review and submit your comments, questions and feedback via the online form at [EPA's Power Sector Modeling Platform v.5.14](http://www.epa.gov/powersectormodeling/) at <http://www.epa.gov/powersectormodeling/>