

WORKING GROUP PRESENTATION FOR DISCUSSION PURPOSES
DO NOT QUOTE OR CITE AS RESULTS ARE SUBJECT TO CHANGE

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FROM: MACROECONOMIC & INDUSTRIAL ENERGY
CONSUMPTION & EFFICIENCY ANALYSIS TEAMS

SUBJECT: First *AEO2015* Macro-Industrial Working Group Meeting
Summary, presented on 07-24-2014

Attendees: Bob Adler (EIA)
Gary Ambach (Michaels Energy)
Mark Bahner (RTI)
Robert D. Bessette (Council of Industrial Boiler Owners)
Gale Boyd (Duke University)
Marilyn Brown (Georgia Tech)
Don Hanson (ANL)
Robert Hershey, Consultant
Keith Jamison (Energetics)
Tom Lorenz (EIA)
Martha Moore (American Chemistry Council)
Anna Shipley, SRA
Peri Ulrey (Natural Gas Supply Association)
Frances Wood (On Location)
Tim Xu (Lawrence Berkeley National Laboratory)

Presenters: Kay Smith, Elizabeth Sendich (Macro)
Kelly Perl, Mark Schipper, Peter Gross, Susan Hicks, Paul Otis
(Industrial)

Macro: The macro presentation provided preliminary AEO2015 projections using IHS Global Insights' (IHS) long-term forecast, with EIA's preliminary energy prices. Important model enhancements implemented for AEO2015, such as updated supply and demand relationships used to project industrial output and rebasing GDP were presented. The presentation focused on: presenting the overall economic environment that underlies the industrial output projections; and delving into more detail on the industrial gross output projections.

Other NEMS modules use macroeconomic concepts, such as industrial output, interest rates, disposable income, and population, so macro projections are produced first during the AEO development process, allowing for presentation of preliminary results for the first Working Group meeting. The population projections include reductions in growth of younger age groups, lower net migration, a lower starting population size, and increased life expectancies, which means longer working life.

The overall GDP growth in the AEO2015 is similar to AEO2014, although there are differences comparing GDP components, with consumption, government and import growth somewhat higher and investment and export growth lower. Export and investment growth is higher in the first 7 years, with more even growth of GDP components during the last 10 years of the projection period. Industrial output growth is slightly lower, although the manufacturing share of gross output is the same as AEO2014, reaching 17% by 2040.

In comparing the AEO2015 industry forecast with the AEO2014, the presenters highlighted the continuing effort at EIA to track the effects of US energy resources, primarily shale, and the impacts of global economies on US production, because energy prices, global markets, and competitiveness are very important to the industrial sector. Also, attention was drawn to the very important historical updates applied to this year's projections for the Input-Output (IO) tables, as well as the IO methodology for using additional data to bring the tables forward through time. These IO changes effectively represent a full 10 years' worth of data updates.

Lower projected export growth in this year's preliminary results is offset by faster growth in personal consumption. Specific goods are affected by these growth changes as the disaggregated categories for trade and consumption vary relative to last year. Changed influences of all final demand categories leads to increased output of bulk chemicals, primary metals, and transportation equipment, while the remaining metal-based durables, nonmetallic minerals, food, and paper output grows slower in the AEO2015 compared to the AEO2014.

Industrial: The industrial part of the working group presentation provided general model development plans associated with major changes and updates for the *AEO2015* version of the Industrial Demand Module (IDM). These included:

1. Process flow status and updates: an update on the status of ongoing process flow project, which replaces energy consumption models based on engineering judgment with specific technology models or equipment choice models. Cement, aluminum

and glass were finished in previous years. Iron and steel and paper industries are scheduled updates for AEO2016

2. Data and regulation updates: will update the historical combined heat and power (CHP) data from EIA statistical programs and make industry-specific benchmarking adjustments. The major regulatory change was a revision to the California Global Warming Solutions Act of 2006 (AB32). The recent clean air act 111(d) Advanced Notice of Proposed Rulemaking (NOPR) will not be modeled for AEO2015.
3. Ethane and propane price: a status update of the Dynamic Linear Model (DLM) for joint ethane and propane pricing was presented. This new model will be implemented for the AEO2015. The importance of this model to other NEMS modules (MAM, OGSM, LFMM, and IDM) was stressed. DLM provides flexibility in regression parameters by explicitly allowing for variability in the regression coefficients – i.e., allows the system properties to change in time. Flexibility of the regression parameters over time is a key component of DLM, and the ability of the new model to adapt to new historical information as it becomes available was also mentioned. Some of the drivers for this new model (chemical shipments, oil & gas prices, and export quantities) were discussed.

Discussion/questions:

1. Will the NAICS code revision affect macro or industrial predictions? In particular, how will treatment of manufacturing outsourcing, where products are fabricated in other countries but production management and design are domestically based, affect macro or industrial predictions?
 - a. The NAICS code revisions will probably impact the definition of industries, meaning that new supply and demand matrices will require revisions in the industrial model. The Bureau of Economic Analysis typically provides detail on comparisons between the two versions of NAICS, allowing for analysis in determining the impact of revisions. The comment period for the NAICS revisions is just ending now, so we don't expect the revisions to happen before 2017.
2. Do the macro or industrial models explicitly model climate change?
 - a. The industrial output model within the macroeconomic module does not explicitly model impacts of climate change, although implicitly they address any expected natural resource limitations that might occur. NEMS does have carbon price side cases that would model the effects of carbon prices from \$10-\$25 per metric tonne.
3. Will the macro or industrial models investigate the effects of 111(d)?
 - a. No, not yet, because the regulation is nowhere near final. As the way the NOPR is written, it appears that few, if any, industrial CHP will be modeled? However, an off-AEO analysis of 111(d) may be the subject of a future service report.

4. Are regional results available?
 - a. Yes, but they are based on a complex technique using historical shares not an explicit regional modeling approach, which would account for unique product/industry specific changes.
5. There was a discussion on the impact of boiler MACT on companies that used small coal boilers.
 - a. Companies that use small coal boilers may choose to shut-down operations rather than use the capital to meet boiler [MACT requirements](#). Smaller boilers (those at facilities that emit less than 10 tons of an individual Hazardous Air Pollutants (HAP) and less than 25 tons of all HAPS combined) face regulations as well, but for the most part the Clean Air Act allows them to meet a less stringent standard, termed “Generally Available Control Technology” (GACT). Some units under the area source rule would be subject to boiler MACT for at least some pollutants. These are the coal-fired units that have a heat input capacity of 10 million Btu per hour or more, but are at facilities that don’t meet the major source definition.

The next scheduled joint macro-industrial work group meeting will occur in the fall of 2014.