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DO NOT QUOTE OR CITE AS RESULTS ARE SUBJECT TO CHANGE

August 5, 2013

MEMORANDUM FOR: JOHN CONTI
ASSISTANT ADMINISTRATOR FOR ENERGY ANALYSIS

PAUL HOLTBERG
TEAM LEADER
ANALYSIS INTEGRATION TEAM

JAMES TURNURE
DIRECTOR
OFFICE OF ENERGY CONSUMPTION & EFFICIENCY ANALYSIS

LYNN WESTFALL
DIRECTOR
OFFICE OF ENERGY MARKETS & FINANCIAL ANALYSIS

FROM: MACROECONOMIC & INDUSTRIAL ENERGY CONSUMPTION & EFFICIENCY ANALYSIS TEAMS

SUBJECT: First *AEO2014* Macro-Industrial Working Group Meeting Summary (presented on 07-30-2013)

Attendees:
Tom Lorenz (EIA)
Bob Adler (EIA)
Julie Harris (EIA)
Russ Tarver (EIA)
Jim Turnure (EIA)
E. Khan (DOE-FE)
Keith Jamison (Energetics)
Robert Hershey, Consultant
Anna Shipley, SRA
Ethen Rogers (American Council for an Energy-Efficient Economy)
Peri Ulrey (Natural Gas Supply Asscociation)
John Meyer (SAIC)

Remote attendees:
Martha Moore (American Chemistry Council)
Frances Wood (OnLocation)
Bhima Sastri (DOE-EERE)
Don Hanson (ANL)
Betsy Dutrow (EPA)
Gale Boyd (Duke University)

Dilo Paul (SAIC)
Gary Ambach (Michaels Energy)
Luke Davulis (Systematic Solutions, Inc.)
Aaron Bergman (DOE-PI)?

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

Macro: The macro presentation provided a preliminary round of Global Insights' (GI) long-term forecast of GDP, employment, productivity, and industrial gross output for a number of aggregate industries. The GDP, employment, and productivity results are critical inputs for many NEMS modules, especially the Industrial Demand Module, thus they are produced first during AEO development, which allows the presentation of preliminary results for the first Working Group Meeting. The critical changes for the overall economy model are related to population revisions, which result from the release of the 2010 Census. These population changes include reductions in growth of younger age groups, lower net migration, a lower starting population size, and increased life expectancies, which mean longer working life (later retirement).

In comparing the *AEO2014* macro industrial forecast with the *AEO2013*, the presenters stressed the importance of incorporating EIA's shale gas expectations (both in terms of robust supply and low price) and how this influenced GI's growth expectations for natural-gas intensive industries. In addition, GI's lower expectations for imports of commodities such as basic chemicals, primary metals, and metal-based durables also contribute to the *AEO2014*'s higher gross output expectations in the short to medium term. Finally, it was pointed out that the *AEO2014* reflects a more optimistic view of growth than the *AEO2013* in metal-based durables, especially fabricated metal products and machinery. Finally, an updated equation for construction, which included more detail and better accounts for the construction of commercial buildings, was implemented for the *AEO2014*.

Specific discussion/questions:

1. Invitees asked the macro presenters why oil prices at EIA are different than GI.
    a. Kay explained GI has an opinion or "view" of the future, which happens to include heavier effects/benefits from shale oil. Also, the current preliminary results do not reflect a new EIA World Oil Price (WOP) path. If the past serves as any marker, however, GI and EIA have deviated, and it was often with GI being lower prices long-term.

Industrial: The industrial part of the working group presentation provided general model development plans associated with major changes/updates for the *AEO2014* 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 and aluminum were finished in previous years and this year glass was finished. The food model has been updated for more detail within the food industry, but food will not be a process flow model because of its complexity. Also, cement was updated to allow multi-channel burners.

2. Efficiency cases will be added for cement and aluminum

3. Accomplished several data updates:

    a. 2010 Manufacturing Energy Consumption Survey,

    b. Updated the industrial model for non-manufacturing surveys to reflect better estimates of energy consumption from USDA and Census energy expenditure surveys. Corrected misclassified energy expenditures in construction from natural gas to LPG.

4. Updated the model for major CHP-using industries. The model updates will allow variation in utilization, risk factor, penetration rate for four major CHP industries allows to run mini side cases

Specific discussion/questions:

1. Invitees requested definition for acronyms, UEC and SEDS?

    a. Susan explained these are Unit Energy Consumption and State Energy Data System.

2. Invitees asked if the MECS sample is the same for the update?

    a. A MECS expert present confirmed, yes, it was approximately 15,000.

3. Invitees asked, regarding the decline in energy consumption between the MECS 2006 and the MECS 2010 results, how do you know if the decline was due to improvements in energy efficiency or the shutdown of inefficient plants?

    a. We don't. The MECS is not designed to provide that level of detail regarding the reasons for changes in energy consumption.

Open discussion/questions:

1. When changing from TPCs to process flow models is there an account of current/commercially-available technology, do we use state of the art technology in our assumptions?

    a. The IDM uses what is commercially available at the time of the models are run, which includes state of the art technologies. Manager noted the positives and negatives of the new process models is each can be researched individually but each must also be filled in and maintained with all

possibilities given that technology is ever changing and new issues will crop up often. Another upside is increased stakeholder interaction.

2. Will this meeting's slides be available?

    a. Yes, a link to the webpage for our Working Group will be sent around, and at that site anyone can access the slides as well as a non-attributed memo summarize the discussion. Reminder was given that all results are extremely preliminary and are not to be cited or distributed.

3. Why is there a difference between the GI baseline and the NEMS estimation for Primary Metals?

    a. The GI baseline estimations are used as inputs into NEMS, which then simulates a variety of energy related metrics, with feedback to the MAM. The effects seen in this industry are due to energy prices, and are most pronounced because of the heavy reliance on a wide range of energy types. For example, this industry is affected by oil, NG, and electricity prices.

4. The effect of shale was noted, specifically which industries have higher output in these preliminary runs?

    a. The non-energy-intensive industries most affected in this year's baselines are fabricated metals and machinery. The energy-intensive industries most affected are bulk chemicals, mostly by way of the feedstock price, and primary metals.

    a.

5. Overall, does EIA have a sense of how much natural gas demand will be in the future?

    a. In short, no too many calculations and updates remain to make any result meaningful, however it was pointed out that given the higher output in the preliminary results it is likely that the consumption calculations will yield higher NG consumption.

6. What is EIA's baseline with respect to LNG exports?

    a. In general, exports are supply side constructs. In addition, EIA does not explicitly model international demand as part of the Industrial Demand Module (IDM).

7. At EIA's conference Tom Fanning had outlined scenarios in which approximately 80 to 100 Bcf of NG per day of demand was possible, but in EIA's last High Resource side case consumption still does not reach this level; could the AEO include a special case to model natural gas demand greater than 100 Bcf per day? It was also pointed out that there was a recent Black and Veech study that reached these levels as well.

    a. Not sure - we would need to increase natural gas demand in all sectors, not just the industrial sector, and none of EIA's side cases are specifically

designed to force NG into any one sector. The transportation sector includes the option to take up NG, but only if it is economical. Another proxy would be to make natural gas really cheap in a model run. However, the EMF26 runs which should be available in 2 -3 months did explore some extreme natural gas scenario that combines EIA's High Resource and High Macroeconomic Growth side cases for low prices and high demand. Modelers offer to review existing side cases to determine how far from the 100 Bcf/d current cases are to determine what is keeping the consumption at the levels reported. The audience was reminded that EIA is mandated to include existing laws, rules, and regulations, and that our Reference case is just that, a reference by which to measure other things.

8. What is the percentage overall of natural gas consumed by the industrial sector?
    a. It is about 30-33%
9. To what degree are the short- and mid-term the focus of work in AEO modeling given their importance with regard to shale?
    a. It was noted that the preliminary results presented, when compared to the last AEO, show our effort to address economic recovery and shale effects in the short and mid- term. It was highlighted the extreme uncertainty is: in the short term due to instability in the recent past and overseas; in the mid-term due to current project announcements not yet being built and the timing of shale; and in the long term because it's so long in the future.
10. Is DRI (Direct Reduced Iron) technology currently represented in the IDM?
    a. No, but DRI will be added when the iron and steel process flow model is added for the next full AEO.

The next scheduled joint macro-industrial work group meeting is on September 26, 2013, from 10am to 12 noon.