

May 22, 2018

MEMORANDUM FOR: Ian Mead
Assistant Administrator for Energy Analysis

FROM: James Turnure
Director of Office of Energy Consumption and Efficiency Analysis
Kelly Perl
Lead of Industrial Efficiency and Consumption Analysis Team

SUBJECT: Summary of first AEO2019 Industrial Working Group Meeting, held on
May 22, 2018

This memorandum provides an overview of presentation given at the first Annual Energy Outlook 2019 (AEO2019) Industrial Working Group meeting and a summary of the discussion that followed. The meeting was a recap and discussion of industrial results from the Annual Energy Outlook 2018 and a solicitation for feedback to improve AEO2019. The presentation given at this meeting is provided in a separate document.

Model results (AEO2018)

The presentation highlighted the following modeling results:

- Value of shipments show fastest growth in the AEO2018. The average annual growth rate 2017-2050 is presented for industries and since shipments change some related energy use change.
- Natural gas is the most consumed energy source in the industrial sector, while industry consumption shares remain mostly steady. Information on natural gas fuel consumption is also crucial to many manufacturing industries, even though three industries (bulk chemicals, refining, and food) consume the majority of it.
- Combined heat and power (CHP) is also increasingly natural gas fired, with bulk chemicals constituting an ever increasing share. CHP in refining, paper and food are also significant.
- Steel blast furnaces (BF) and electric arc furnaces (EAF) shares remain steady; small declines in energy intensity over time. Steel EAF proportion steady at 67% throughout projection.
- Paper energy consumption increases 1%/year, where renewables and natural gas is fastest growing source of energy usage. Shifted inputs for two recovery technologies increase black liquor output.

Model development (AEO2019)

The preview of potential AEO2019 model updates included a review of the types of pulp used in the paper industry. In addition, research will be focused on how paper composition is expected to change over time, the trend in recent retirements of coal CHP, and the acceleration of bulk chemicals CHP coal retirements. Further, updates to physical output measures for the process flow industries (aluminum, cement includes lime, glass, paper, and steel) will be considered.

Not all of these updates may be immediately reflected in AEO2019. In addition, a recycling side case may also be considered in subsequent AEOs.

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

Discussion

Some discussion after the presentation revolved around sources of industrial output measures that will be used. EIA staff indicated that they would be using Federal Reserve Industrial tables as a data source. Staff also indicated that they would provide the lists to anyone interested after the meeting.

Some participants wondered whether physical units could be provided as an output of EIA's model. EIA staff indicated that predicting physical output over the entire projection period is difficult and the exercise is fraught with measurement issues when looking beyond a handful of industries. As a result, EIA does not officially release such information as part of the AEO. However, process flow industries do have measures of output associated with them that are included as part of the technology choice results, which are available upon request.

There was also a discussion of how macroeconomic conditions are connected to the energy sector. Some people thought that because unit energy consumption declines over time, long-term U.S. macroeconomic growth might increase as a result. While this is a possibility, EIA staff indicated that the United States may not necessarily become more competitive in that regard because other countries may reap the rewards of lower energy intensity as well and there are many other factors that are traditionally thought of as determinants of long-run economic growth.

A discussion ensued related to the steel industry technologies of EAFs and BF's. Three EAF plants have been announced recently, and there is indication that there may be a small increase of EAF from 67% to 70% within the next five years. This proportion would remain steady unless there was a large increase in infrastructure spending. The EAF is an advantage in terms of EAF revamping strategy for reducing operating costs, energy needs, and particulate emissions while increasing yield and productivity.

One participant asked whether there will be tariffs side case for the AEO2019. Staff indicated that there will not be a special side case because it was a short AEO year. However, EIA will continue to monitor the situation for the Reference case.

Another participant asked whether projected increases in natural gas prices may result in the use of less natural gas in the industrial sector. Staff indicated that natural gas is becoming more of a primary fuel used in the sector. In addition, one must consider the price of natural gas in relation to the prices other fuels, so such as result is not an absolute given.

One final question related to the use of renewable fuel use in the paper industry. Staff indicated that the industry is not currently focused on greatly increasing the use of renewables and over near horizon, but some increase over the typical AEO projection period is possible. Currently, such an increase is not expected to be large.

Attendees

Non-EIA Attendees (in person)

	<u>Affiliation</u>
Joe Cresko	DOE Advanced Manufacturing Office
Robert Hershey	Self
Keith Jamison	Energetics
John Meyer	Leidos

Guests (WebEx/phone)

Nate Aden	World Resources Institute
Kevin Blaser	Energy Buyer/Trader Saginaw Chippewa Indian Tribe of Michigan
Paul Donohoo-Vallett	DOE-HQ
R. Neal Elliott III	Sr. Director, Research ACEEE
Paul Friley	Self
Rebecca Hanes	DOE National Renewable Energy Laboratory
Lukas Hansen	Market Analyst National Energy Board of Canada
Rudy Kahsar	DOE-Energy Efficiency and Renewable Energy
Skip Laitner	Principal, Economic and Human Dimensions Research Associates
Eric Masanet	Professor, Northwestern University
Francesco Memoli	Executive Vice President TENOVA INC.
William Morrow	Lawrence Berkeley National Laboratory
Hannah Pitt	Research Analyst Rhodium Group
Michael Russo	ITRON.com
Robert Schutz	CTO LEENA Laboratories
Walt Tunnessen	EPA
Brian Walker	DOE-Energy Efficiency and Renewable Energy

EIA attendees (in person)

Bob Adler
Angelina LaRose
Paul Otis
Kelly Perl
Elizabeth Sendich
Matthew Skelton

EIA attendees (WebEx/phone)

Mark Schipper