

September 12, 2016

MEMORANDUM FOR: Ian Mead
Assistant Administrator for Energy Analysis

FROM: John Staub
Team Lead, Exploration and Production Analysis

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Subject: First AEO2017 Oil and Gas Working Group Meeting held on
August 25, 2016

The meeting began with an overview of the areas under focus for the AEO2017 in the Oil and Gas Supply Module (OGSM) and the Natural Gas Transmission and Distribution Module (NGTDM). Initial results from model runs were also presented and questions were addressed. The presentation slides used to support this discussion are provided in a separate document.

Model updates

The *AEO2017* is a “short” update, where few improvements are typically introduced into the model. However, a few improvements were made to the overall model during the current AEO cycle:

- The model projection was extended to 2050
- AEO cases were limited to 1) reference, high and low prices cases, 2) high and low economic cases, 3) high and low resource and technology cases.
- The *AEO2017* will reflect changes in the world oil price path

For oil and gas supply modeling, the following updates were made:

- The offshore Gulf of Mexico and Alaska were updated
- Estimated ultimate recovery (EUR) will be updated with another year of data

For natural gas market modeling, the following were made:

- Pipeline imports and exports were updated
- U.S. liquefied natural gas (LNG) exports and change in projects under construction

Discussion/questions (OGSM)

Offshore updating procedures were presented, and there were no questions.

TAPS shut down was mentioned as happening within the time horizon of AEO2017, which led to several questions:

- *Has anyone investigated GTL conversion to continue using the pipeline rather than shutting it down?* Yes, and it was thought to be uneconomical.
- *Can GTL liquids could be used to thin the oil so that lower flowrates could be achieved?* Yes, we are looking into this topic.

Resource availability and technological change was discussed, which led to several questions:

- *Are assumptions of technology only current technology in use?* Technology increases 1% a year and increases well level EURs in developing areas. Technology improves EURs more quickly in areas that are not yet developing.
- *Have you investigated drilling density performance changes?* We look at spacing of wells but not lateral lengths. We see evidence of diminishing returns in the data from interfering wells, and this is represented in the high resource case.
- *Can cost improvements changed because of advances in technology?* If the model drills more wells in a unit of time, the costs rise and prices are pushed up. Costs can also decrease with a drop in activity.
- *How much analysis of existing infrastructure has been done?* Pipeline constraints and planned builds are represented in first two years, after which pipelines are built to alleviate this problem.
- *If you add up all the resources you project to be produced, do you have enough resources to support that rate of production? Perhaps you are using a highly successful case to create these numbers?* We have a lot of resources in the Bakken and Permian.
- *Based on how many resources you are assuming, do you nearly have to assume all drilling locations are used?* We run a low resource case as a sensitivity test.
- *If you drop recovery by 50%, won't you not have any low cost resources?* When higher price levels return, this would bring drilling and production activity back up.

Discussion/question (NGTDM)

A number of questions arose during the discussion of natural gas market results:

- *Why do prices appear to stay low for a long period of time?* Natural gas resources are large and technological improvements counter much of the effect of moving from lower cost to higher cost areas.
- *Do you assume power demand grows?* It is growing, about 0.9% / year as a national average, with Texas being about 1%/ year. We see LNG exports as an important component of demand growth, along with pipeline exports to Mexico which have been increasing in the near term. Likely future modeling efforts will be focused on improving the representation of Canada and Mexico. [Stakeholder Comment-There is going to be an oversupply of LNG in next 5 years relative to LNG demand around the world, which will make it difficult for US LNG exports.]
- *Does the model build liquefaction terminals or are they assumed?* LNG export capacity for the five terminals under construction are set exogenously. Thereafter, the model builds liquefaction terminals when domestic prices plus liquefaction, transport, and regasification costs are lower than estimated alternative prices in Asia and Europe. This capacity will generally stay at near full utilization unless the price differential narrows below the “sunk” liquefaction cost.
- *Will the mismatch between prices and known low price areas like NE and the need for more pipelines with transport cost be accounted for?* Pipelines are built when price differentials are high enough between regions. The model effectively includes a hurdle rate that is necessary to exceed before capacity is added.

Guests (WebEx/phone)

Svetlana Ikonnikova

Bob Hugman

Gurcan Gulen

Mark Jensen

Matt Hansen

John Browning

Melissa Whitten

Harry Vidas

Michael Baer

Dave S.

Robert Smith

Joe Brucke

Katy D.

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Bridget Scanlon
Nancy Johnson
K. Strelle
Geoffrey Brand
Anthony Yuen
Charles Nevle
Zeryai Hagos
Kim Coffman
Paul Pierson
Richard Meyer
Richard Nehring
Phyllis Martin

EIA attendees (in person)

Joseph Benneche
Katie Dyl (presenter)
Terry Yen
Danya Murali
John Staub (presenter)

EIA attendees (WebEx/phone)

Dana Van Wagener (presenter)
Troy Cook
Laura Singer
David Manowitz
Faouzi Aloulou