Macro Industrial Working Group
Preliminary Industrial Results for AEO2013

Macro Industrial Working Group (MIWG)

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WORKING GROUP PRESENTATION FOR DISCUSSION PURPOSES

DO NOT QUOTE OR CITE AS RESULTS ARE SUBJECT TO CHANGE

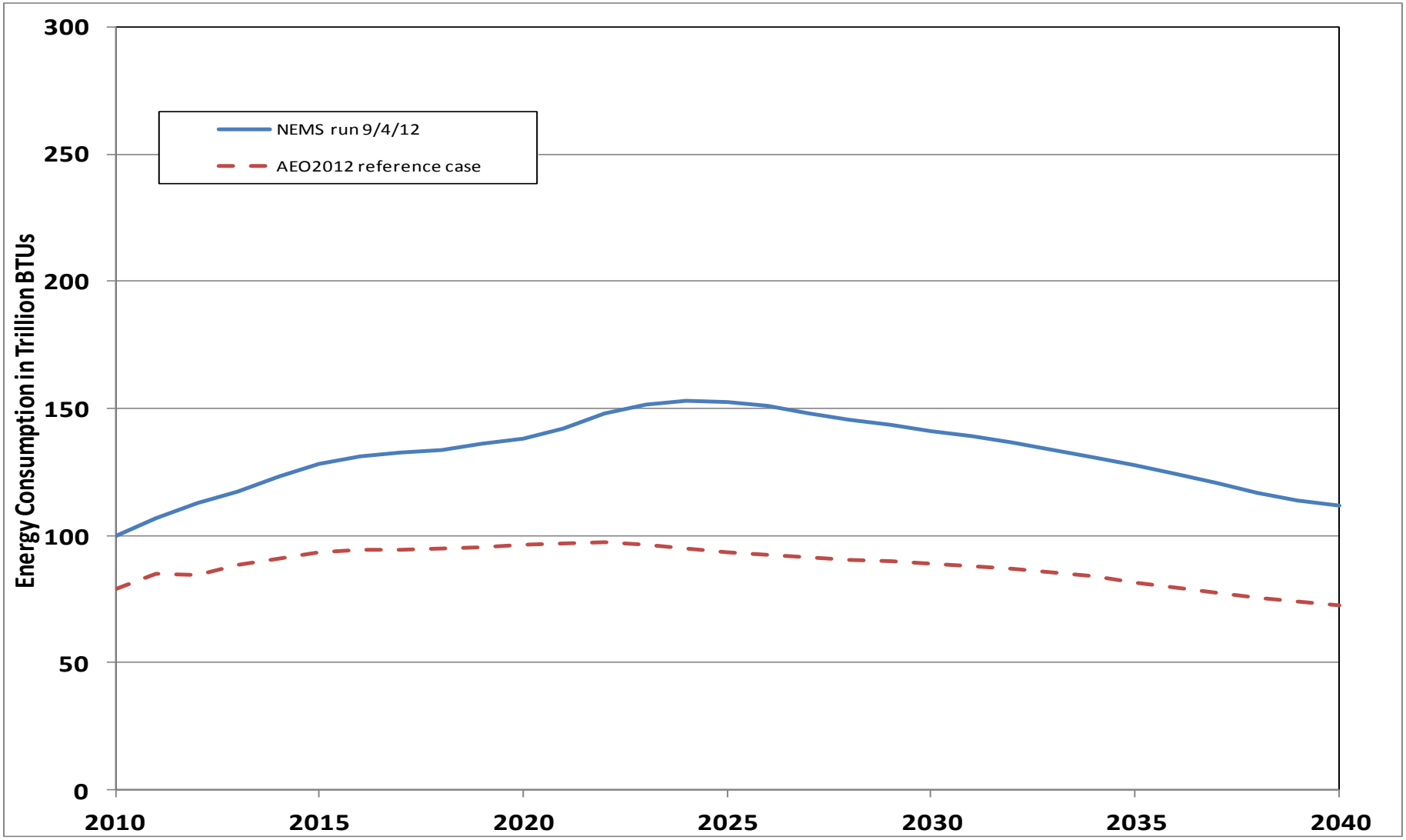
Overview

- Aluminum process flow (2nd in series)
- Non-manufacturing
- NGL price drivers & bulk chemicals
- Environmental updates
- CHP updates

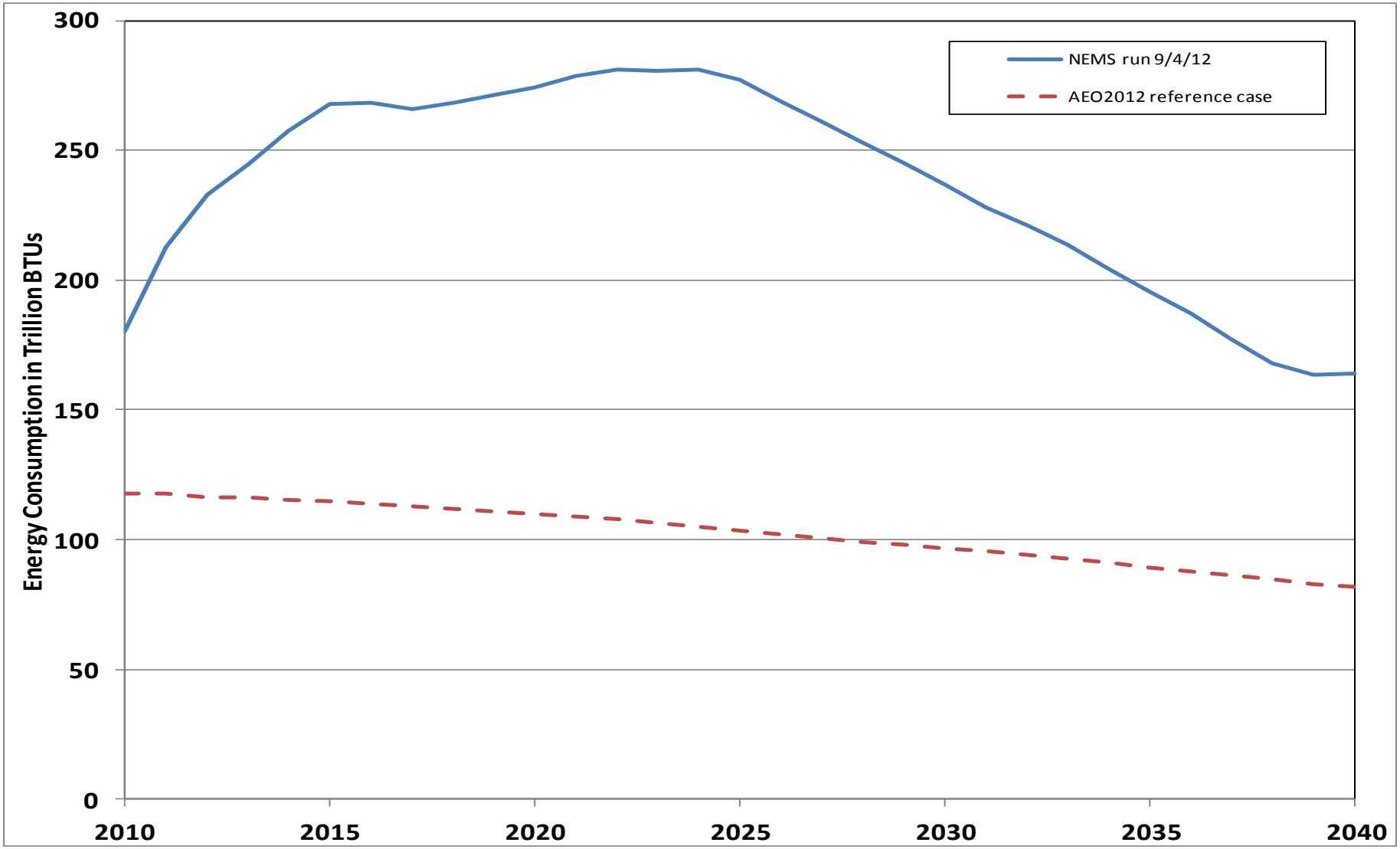
Process flow: Aluminum results

- New aluminum model allows for technology choice in all facets of raw aluminum and finished products;
- No new potlines/primary smelters built in U.S.; but use of primary capacity varies as potlines at smelters are allowed to come back (subject to projected electricity prices) on line as aluminum industry recovers;
- Energy consumption higher in both electricity and natural gas
  - Industrial output
  - Update in retirement assumptions

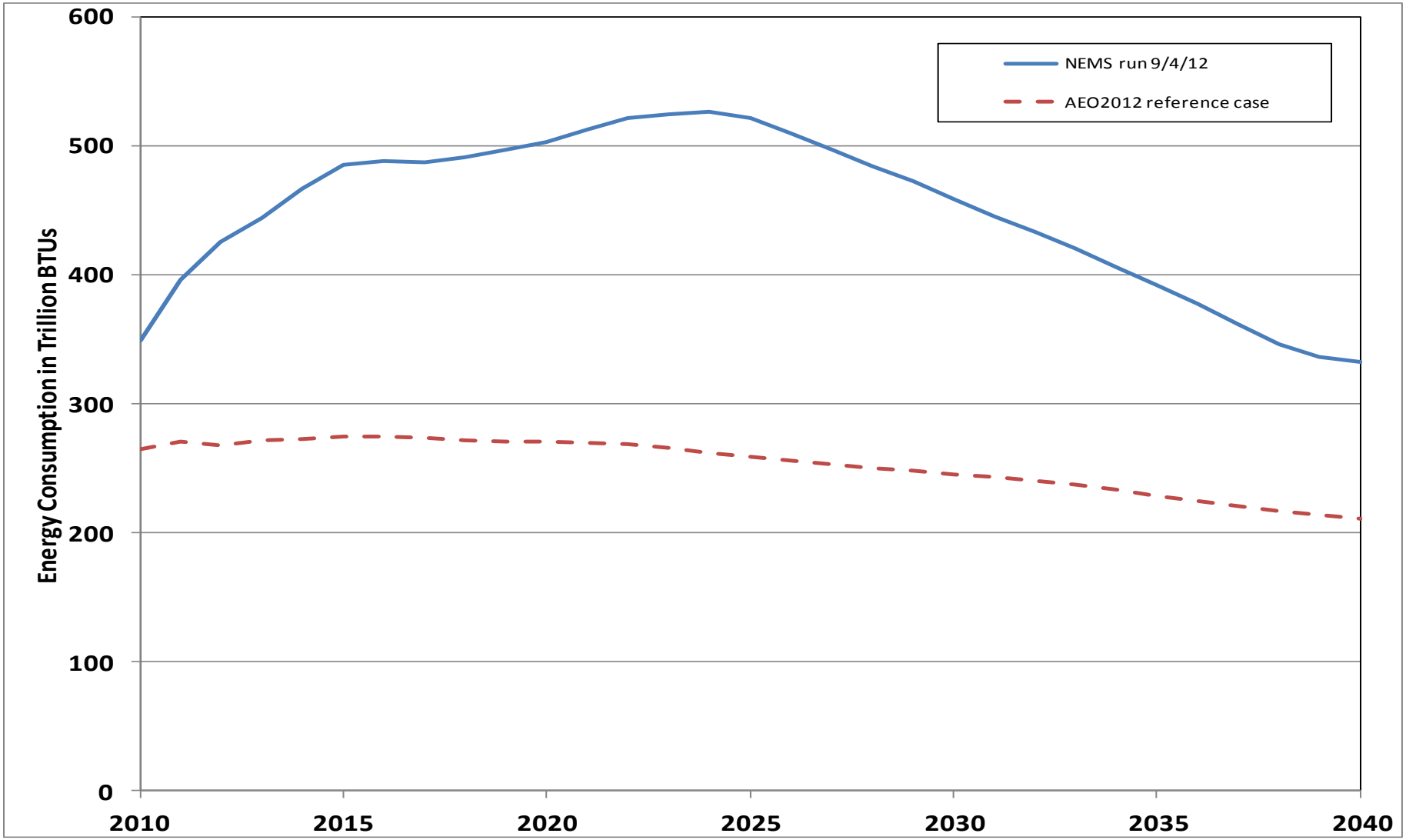
Aluminum: natural gas consumption



Aluminum: electricity consumption



Aluminum: total energy consumption



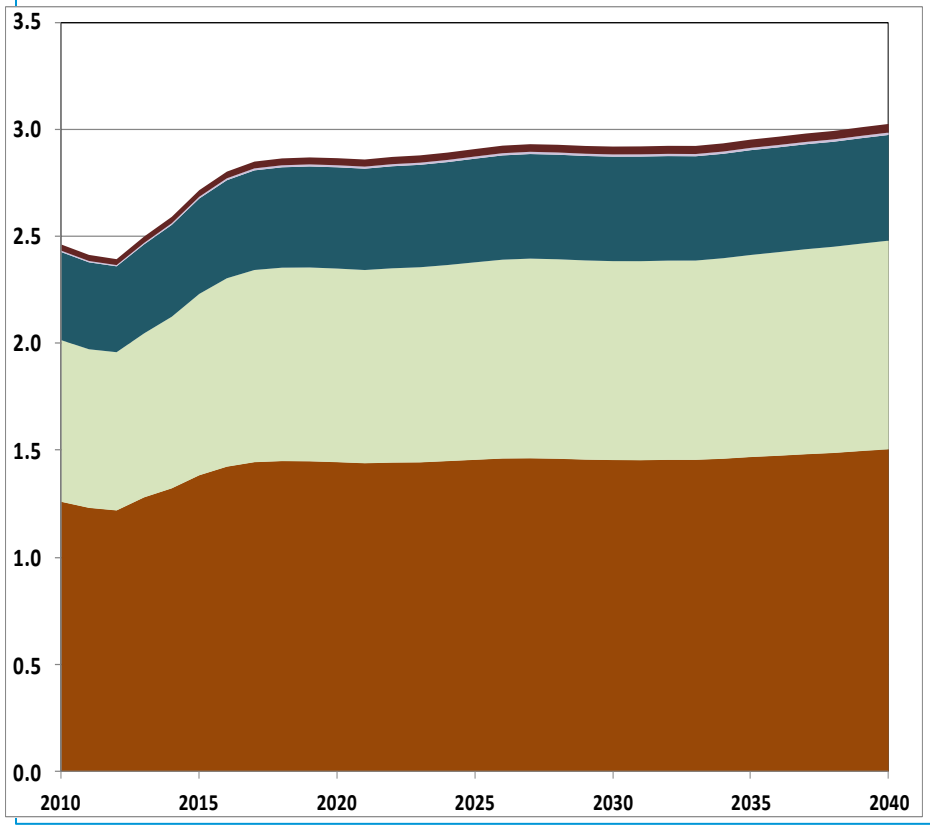
Non-manufacturing

- Non-manufacturing energy consumption drivers "endogenized" with buildings and transportation module energy efficiency drivers
- Mining (coal + oil & gas sectors) includes productivity drivers
- Energy consumption increases with shipments; energy supplies

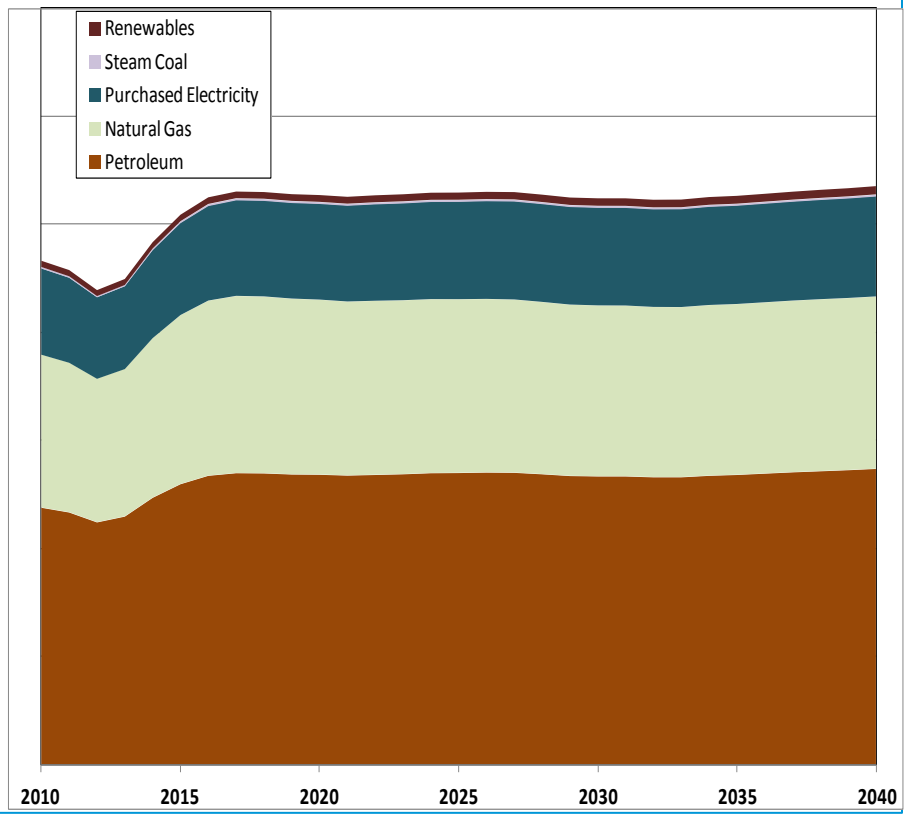
Non-Manufacturing heat and power energy consumption

(units in quadrillion btus)

- NEMS 9/4/2013



- 2012 Reference Case



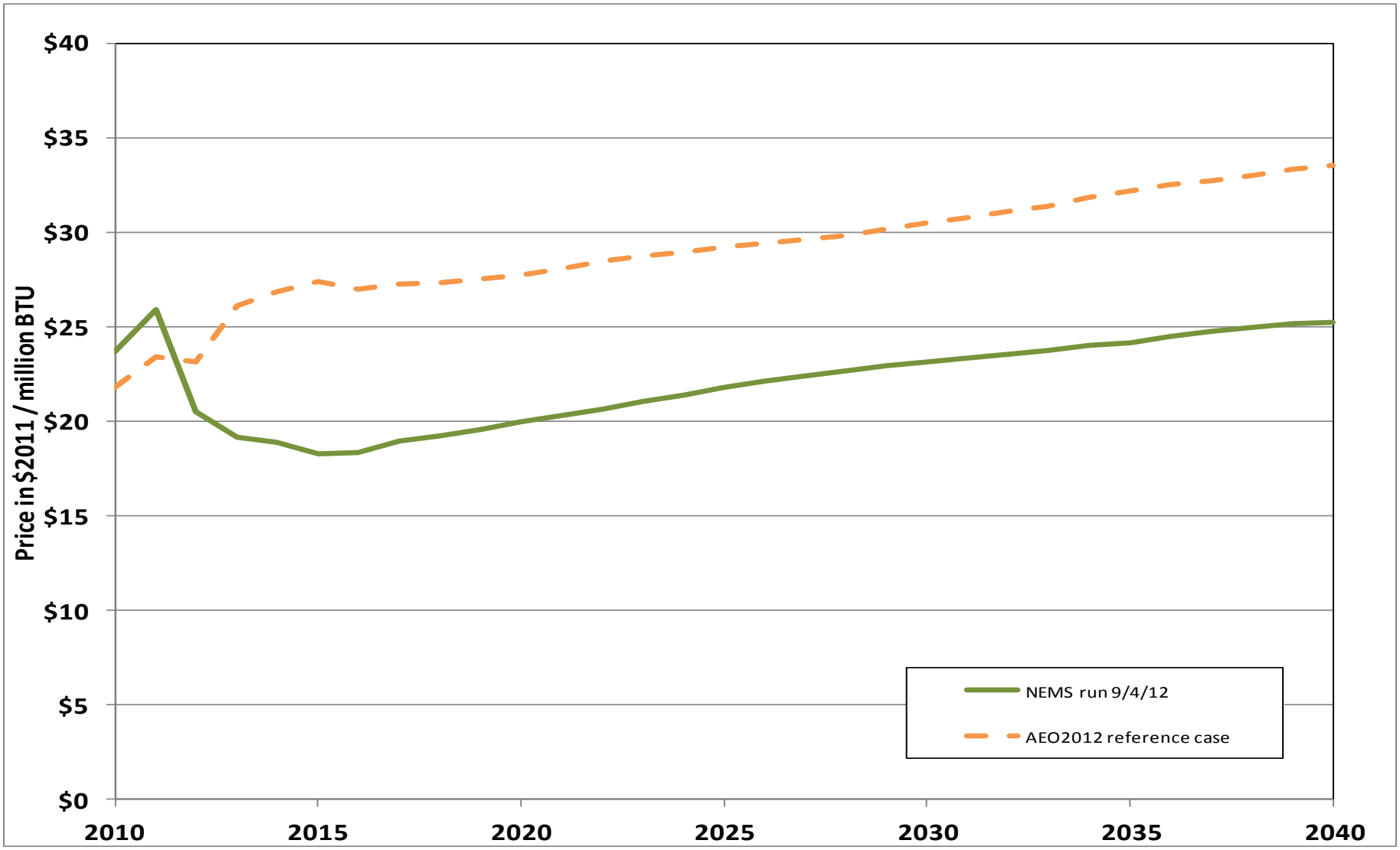
Natural Gas Liquids (NGL) pricing & Bulk Chemicals

- NGL prices relative to naphtha
- Feedstock requirements of additional petrochemical capacity
- Don’t forget shipments!

Natural Gas Liquids (NGL) pricing & Bulk Chemicals

- Multi-team effort to forecast NGL prices
  - Regression-based but allowing for more than “typical” explanatory variables
  - Bayesian approach/Dynamic Linear Models
  - Sectoral propane prices
  - Useful for chemical feedstock choice and as input for chemical gross output
  - Feedstock choice to be based on demand for basic petrochemicals and relative feedstock pricing

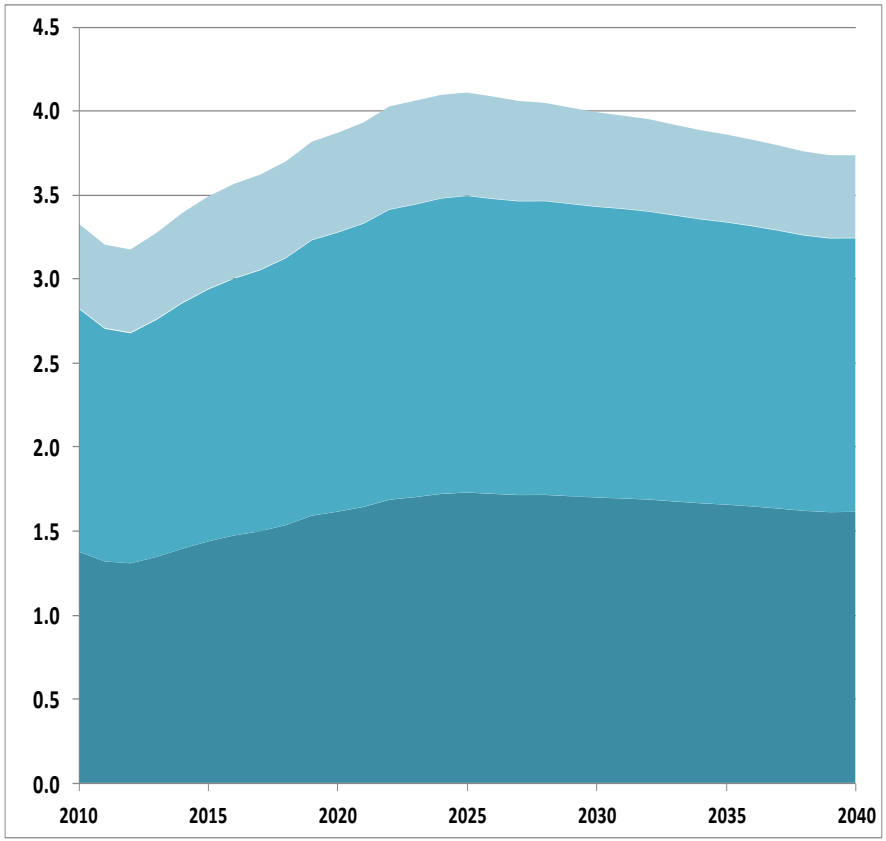
NGL/LPG pricing to industrial customers



Bulk Chemicals: feedstock consumption

(units in quadrillion btus)

- NEMS 9/4/2013



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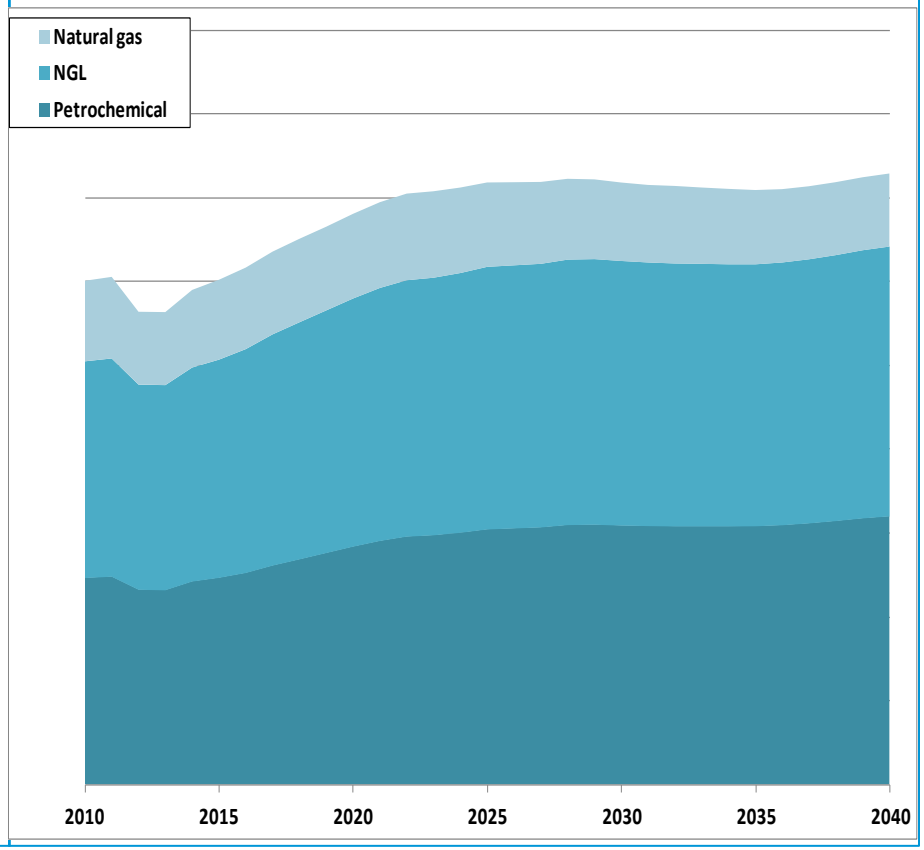

Environmental

- California Global Warming Solutions Act of 2006: AB32 cap & trade
  - Multi-module adaptation: EMM, LFMM, IDM, Integration
  - Interpretation challenge: cannot pick up California macro changes
  - Cannot measure leakage in NEMS, although the California Air Resources Board (CARB) has measures to prevent or reduce
- U.S. EPA: Boiler MACT
  - Estimated compliance cost represented as change in industrial final demand
  - Food, Iron & Steel, Chemicals, BOM most affected
  - Update fuel cost/selection factors to represent and incent compliance primarily through ‘fuel switching’

Combined Heat and Power (CHP)

- Economic Assessment: Utilization
  - Lowered assumptions for utilization; since AEO2012, IDM simulates the utilization of installed CHP systems based on historical utilization rates and is driven by end-use electricity demand – i.e., updated appraisal incorporates historical rather than assumed capacity factors for new CHP facilities
  - Utilization of new CHP additions now expanded to allow for both industry and regional differences
  - Update industrial CHP based on EIA's historical data; preliminary 2011 data from EIA Office of Energy Statistics (OES)
  - Will update regional CHP scorecards when ACEEE data becomes available
- Industrial CHP Coverage
  - Starting with AEO2012, *regulated* generators are modeled under EMM
    - Modeling impact is movement of a few hydropower facilities from industrial sector to power sector

Thank you for your attention!

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