Industrial team plans for AEO2014

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DO NOT QUOTE OR CITE AS RESULTS ARE SUBJECT TO CHANGE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 -- AEO2014

- Process flow status & updates
- Other model updates
- Major data updates
- CHP updates

Process flow models

- General:
  - Replace energy consumption based on engineering judgment with specific technology or equipment choice e.g. anode production for primary aluminum
  - Also can choose technology diffusion
  - Technologies are primarily based on CIMS data from DOE's Pacific Northwest National Laboratory
- Completed by AEO2013
  - Cement & Lime
  - Aluminum
- Completion for AEO2014
  - Glass (defaulted)
  - Food (not a process flow model; revise on more detailed shipments data)

Glass characteristics

- Glass types used in process flow model
  - Flat glass
  - Container glass
  - Pressed & blown glass
  - Glass fiber
  - Note: glass made from purchased glass still uses TPC approach
- Process steps: preparation, furnace, form & finish, tempering (flat glass only)
- Furnace types include conventional, electric boost, & oxygen fueled

Other planned model updates

- Cement multi-channel burner addition to CIMS (defaulted) adds flexibility for fuel mix of mono-channel burners for later AEOs and contributes to AEO2014 efficiency side cases.

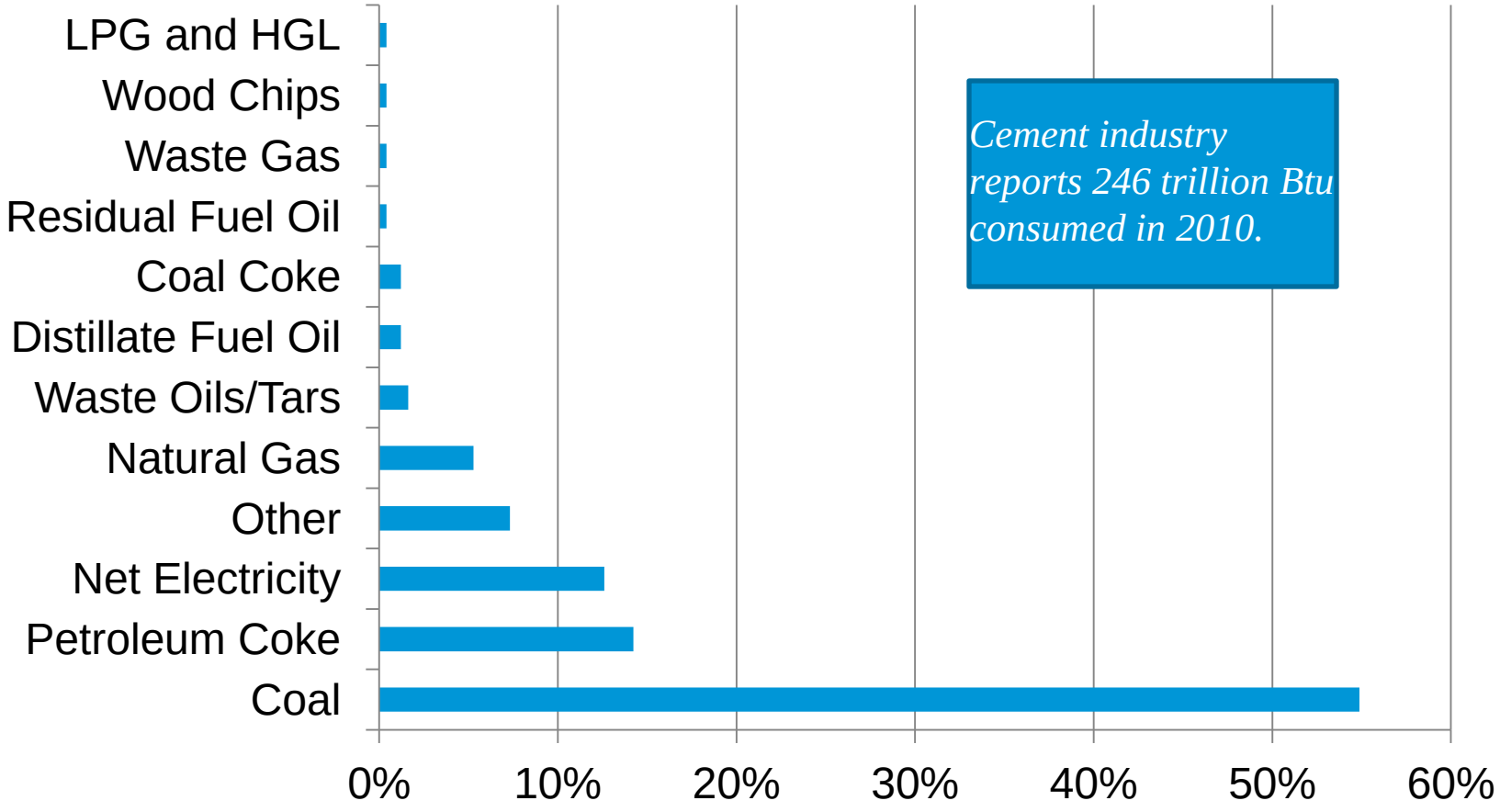
- Efficiency case for cement
  - Multi-channel burners considered state-of-the-art in cement industry
    - Allow significant amounts of secondary fuels – i.e., achieve high or higher levels of alternative solid fuels (ASF) – e.g., tires, plastics, wood, waste
    - Fuel mix for individual kilns is unavailable but IDM presumes a 12 percent share of ASF in dry process kilns; wet process is likely higher
  - More rapid penetration of energy efficient grinding; affects electricity

- Efficiency case for aluminum

Cement burner technology update

Fuel share in the cement industry
percent

AEO2013: 6 mono-channel burner technologies
AEO2014: Adds a multi-channel burner technology



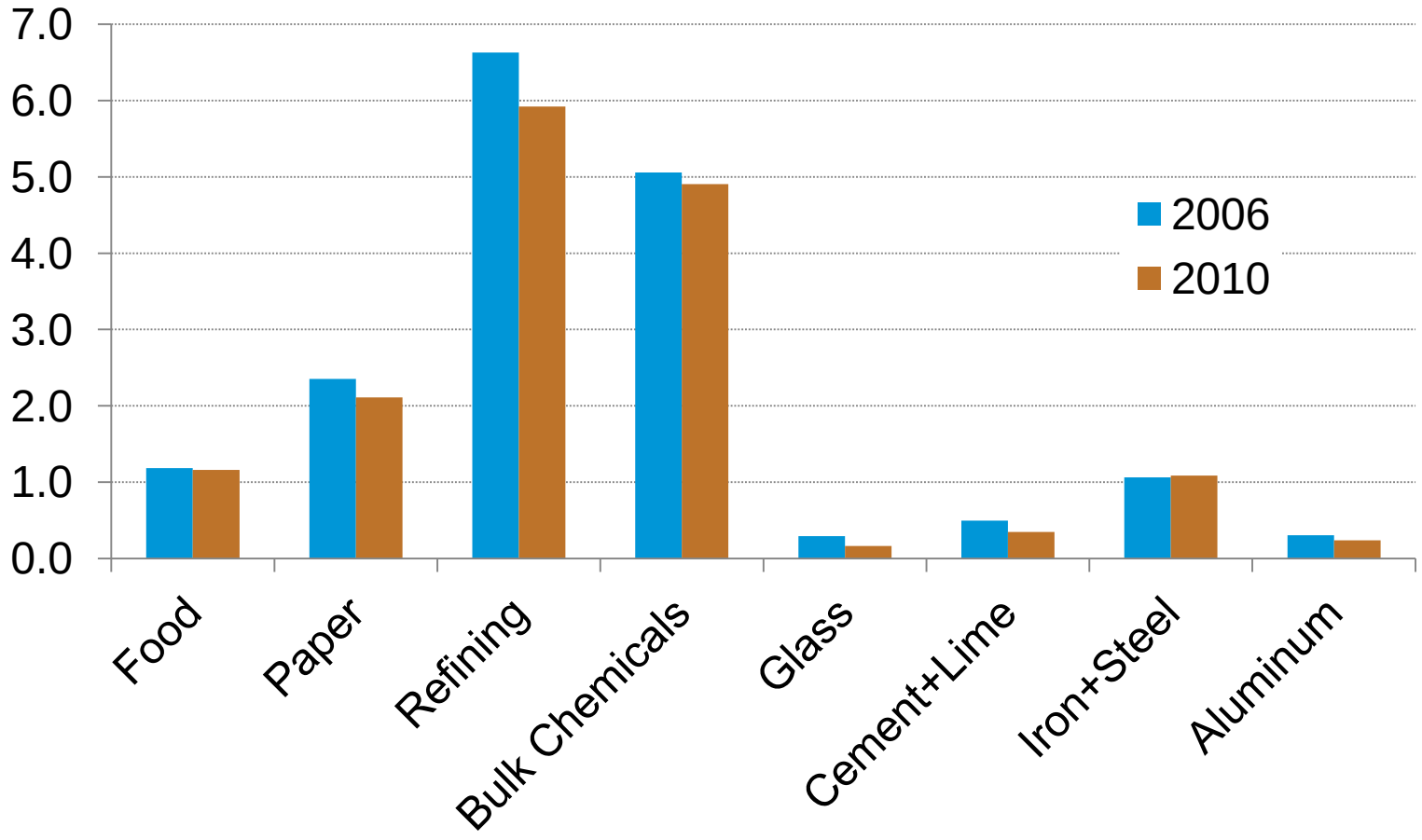
Source: U.S. Energy Information Administration, MECS2010.

Major data updates

- Quadrennial MECS update to 2010
- New nonmanufacturing data approach
  - Uses Census and USDA data to derive usage data from expenditures
  - Improves estimation of nonmanufacturing energy use for *individual tables* instead of relying on SEDS – MECS;
    - construction use of natural gas had been overestimated
    - Construction expenditures were for “Natural gas OR manufactured gas”
  - Will use SEDS – MECS for benchmarked figures in Table 6, main industrial table, of the AEO

MECS 2010 v. MECS 2006

Energy use in quadrillion btu



Combined Heat and Power (CHP)

- Differentiation for major CHP-using industries: bulk chemicals, paper, food, iron & steel (refining modeled in LFMM)
  - Allow variation in utilization, risk factor, penetration rate for four major CHP industries allows to run mini side cases
  - Big 4 industries constitute more that 75% of IDM CHP in all AEO2013 years
  - All other industries undifferentiated
- Regional differentiation
- Data updates
  - Update industrial CHP based on EIA's historical data
  - Will update regional CHP scorecards when ACEEE data becomes available

Thank you for your attention!

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