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DO NOT QUOTE OR CITE AS RESULTS ARE SUBJECT TO CHANGE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

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>60%</td>
</tr>
<tr>
<td>Petroleum Coke</td>
<td>40%</td>
</tr>
<tr>
<td>Net Electricity</td>
<td>20%</td>
</tr>
<tr>
<td>Other</td>
<td>10%</td>
</tr>
<tr>
<td>Waste Oils/Tars</td>
<td>5%</td>
</tr>
<tr>
<td>Distillate Fuel Oil</td>
<td>4%</td>
</tr>
<tr>
<td>Waste Gas</td>
<td>4%</td>
</tr>
<tr>
<td>Residual Fuel Oil</td>
<td>3%</td>
</tr>
<tr>
<td>Coal Coke</td>
<td>3%</td>
</tr>
<tr>
<td>Distillate Fuel Oil</td>
<td>2%</td>
</tr>
<tr>
<td>LPG and HGL</td>
<td>2%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>1%</td>
</tr>
</tbody>
</table>

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

Cement industry reports 246 trillion Btu consumed in 2010.

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

- Food
- Paper
- Refining
- Bulk Chemicals
- Glass
- Cement+Lime
- Iron+Steel
- Aluminum

2006
2010

Energy use comparison for various industries.
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 than 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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