IEA Global Industry Dialogue and Expert Review Workshop

Paris, October 7
Aluminium break out group

- ETP 2014 preliminary results feedback
  - Production, energy use, fuel mix shifts
- Energy market changes and impact in
  - Fuel mix
  - Regional production shifts
  - Regional industrial competitiveness
- Views on BATs values
- Emerging technologies status, expected progress
  - Sector specific emerging technologies
  - CCS demonstration and deployment needs and prospects
- ETP Industry model improvement → data availability
- ETP 2015 potential topic discussion → The role of industry in the climate negotiations
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<thead>
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<tbody>
<tr>
<td>Current BAT Tracking Clean Energy Progress/ Worrell, et al. Berkeley National Laboratory¹</td>
<td>2013</td>
<td>10.4</td>
<td>1.21</td>
<td>0.35</td>
<td>49</td>
<td>2.5</td>
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<tr>
<td>World Aluminium Statistics *2012 world averages</td>
<td>2013</td>
<td>13.5</td>
<td>-</td>
<td>-</td>
<td>52.7</td>
<td>-</td>
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¹ “World Best Practice Energy Intensity Values for Selected Industrial Sectors”
Start conversion to a different platform, future structural changes:
- Capacity vs production → level of capacity utilisation
- Capacity characterization by plant size categories
- Separate modeling of waste heat recovery potentials
- Improve technologies capital and operational costs assessment

Waste heat recovery potential by sector
- Cement industry analysis through IEA India Cement Roadmap → 550 MW existing potential
Aluminium - Production

Primary Aluminium production (Mt)

<table>
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<tr>
<th>Year</th>
<th>Low-demand case</th>
<th>High-demand case</th>
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<tr>
<td>2011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
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<tr>
<td>2020</td>
<td></td>
<td></td>
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<tr>
<td>2030</td>
<td></td>
<td></td>
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<tr>
<td>2050</td>
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Major Primary Aluminium production growth

- Developing Asia: 60%
- Middle East: 13%
- EITs: 6%

2050 vs 2011 low demand
Aluminium - Energy use

Aluminium energy use 6DS 2050 (Total 253 Mtoe)
- Electricity: 54%
- Coal: 18%
- Oil: 13%
- Gas: 15%
- Other: 0%

Aluminium energy use 2DS 2050 (2DS) (Total 204 Mtoe)
- Electricity: 52%
- Coal: 18%
- Oil: 14%
- Gas: 16%
- Other: 0%

Note: Other includes: heat, combustible biomass, waste and other renewables.
Aluminium - CO2 emission reductions

Major CO2 emission reduction contributions

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<th>6DS vs 2DS (2050)</th>
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<tbody>
<tr>
<td>China</td>
<td>53%</td>
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<tr>
<td>India</td>
<td>11%</td>
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<tr>
<td>EITs</td>
<td>9%</td>
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Note: Direct and indirect CO2 emissions are included.