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ExxonMobil Refining & Supply  

Diesel Engine-Efficiency and  
Emissions Research (DEER)  
2008 Conference  
Dearborn, Michigan  
August 4, 2008

This presentation includes forward-looking statements. Actual future conditions (including economic conditions, energy demand, and energy supply) could differ materially due to changes in technology, the development of new supply sources, political events, demographic changes, and other factors discussed herein (and in Item 1 of ExxonMobil’s latest report on Form 10-K). This material is not to be reproduced without the permission of Exxon Mobil Corporation.
• **Energy Demand Outlook**
  - Detailed buildup by country and end-use sector
  - Links energy use to economic drivers
  - Incorporates efficiency improvements
  - Considers trends, economics, and supply by fuel type
  - Reflects assessment of potential policy initiatives

• **Oil & Gas Supply Outlook**
  - Incorporates ultimate recoverable resource estimates
  - Models production profiles for all countries or regions
  - Considers economics and ongoing advances in technology
Global Economics and Energy

<table>
<thead>
<tr>
<th>GDP</th>
<th>Energy Intensity</th>
<th>Energy Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trillion 2005$</td>
<td>BOE/2005$K GDP</td>
<td>MBDOE</td>
</tr>
<tr>
<td>100</td>
<td>3</td>
<td>350</td>
</tr>
<tr>
<td>1980 – 2005</td>
<td>-1.0%</td>
<td>1.8%</td>
</tr>
<tr>
<td>2005 – 2030</td>
<td>-1.6%</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

Average Growth / Yr.
- 1980 – 2005: 2.9%
- 2005 – 2030: 3.0%
World Energy Demand

By Fuel

- MBDOE
- Average Growth / Yr. 2005 – 2030
- Oil: 1.2%
- Gas: 0.9%
- Coal: 1.7%
- Other: 1.7%

By Sector - 2030

- Power Generation
-Res / Comm
-Chemicals
-Heavy Manufacturing
-Transportation

~ 324 MBDOE
Global Transportation Demand

Average Growth / Yr. 1980 - 2005

2.2%

Commercial
2.4%

Personal
2.0%

Light Duty Vehicles

Heavy Duty Vehicles

Aviation

Marine

Rail

0 10 20 30 40 50


MBDOE

ExxonMobil
Global Commercial Transportation

By Sector

- Heavy Duty Vehicles: 1.7%
- Aviation: 3.3%
- Marine: 2.4%
- Rail: -3.0%

Average Growth / Yr. 1980 - 2005: 2.4%

Growth 1980 - 2005

MBDOE

Demand versus GDP

MBDOE

GDP (Trillion 2005$)
Global Commercial Transportation

Average Growth / Yr. 2005 – 2030

- Marine: 2.3%
- Rail: 0.9%
- Aviation: 2.6%
- Heavy Duty Vehicles: 2.2%

MBDOE

Commercial

Global Transportation Demand

**OECD**

<table>
<thead>
<tr>
<th>MBDOE</th>
<th>Average Growth / Yr. 2005 - 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

- **Light Duty Vehicles**
  - Average Growth: 1.7%

- **Heavy Duty Vehicles**
  - 1980: 10, 2005: 15, 2030: 20
  - Average Growth: 1.2%

- **Other Transport**
  - 1980: 5, 2005: 10, 2030: 15
  - Average Growth: -0.5%

**Non-OECD**

<table>
<thead>
<tr>
<th>MBDOE</th>
<th>1980</th>
<th>2005</th>
<th>2030</th>
<th>Average Growth / Yr. 2005 - 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>3.1%</td>
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</tbody>
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- **Light Duty Vehicles**
  - 1980: 10, 2005: 15, 2030: 20
  - Average Growth: 3.6%

- **Heavy Duty Vehicles**
  - 1980: 5, 2005: 10, 2030: 15
  - Average Growth: 2.8%

- **Other Transport**
  - Average Growth: 3.4%
Liquids Supply & Demand

Average Growth / Yr.
2005 – 2030
1.3%

Liquids Demand

Non-OPEC Crude & Condensate

NGL, OPEC Condensate, Other

Non-OPEC Oil Sands

Non-OPEC Crude & Condensate

Biofuels

OPEC Crude

Liquids Demand

Average Growth / Yr.
2005 – 2030
1.3%


120
90
60
30
0

ExxonMobil
World Energy Demand – Primary Energy Supplies

Primary Energy

<table>
<thead>
<tr>
<th>Primary Energy</th>
<th>Average Growth / Yr. 2005 - 2030</th>
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<tbody>
<tr>
<td>MBDOE</td>
<td></td>
</tr>
<tr>
<td>350</td>
<td>1.3%</td>
</tr>
<tr>
<td>300</td>
<td></td>
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<tr>
<td>100</td>
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<tr>
<td>50</td>
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Renewables

<table>
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<th>Primary Energy</th>
<th>Average Growth / Yr. 2005 - 2030</th>
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<tr>
<td>45</td>
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<tr>
<td>10</td>
<td></td>
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<tr>
<td>5</td>
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Wind, Solar & Biofuels

<table>
<thead>
<tr>
<th>Primary Energy</th>
<th>Average Growth / Yr. 2005 - 2030</th>
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</thead>
<tbody>
<tr>
<td>MBDOE</td>
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<tr>
<td>6</td>
<td>8.7%</td>
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<tr>
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<tr>
<td>1</td>
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</table>

Source: ExxonMobil
**ExxonMobil Technologies**

Gasoline Internal Combustion Engine from Crude Oil – Well-to-Wheels Analysis

- **Crude Recovery**
- **Crude Transportation**
- **Crude Refining to Products**
- **Product Storage & Transportation**
- **Retail Site**
- **Gasoline Vehicle**

**Well-to-Tank Technologies**

- Energy Efficiency
- Cogeneration
- Flare Reduction

**Tank-to-Wheels Technologies**

- Advanced Lubricants (Mobil 1 AFE)
- Low weight plastics
- Films for Li-ion Batteries
- Tire Inner liners
- HCCI Research
- On-board hydrogen generation

**Source:** WTW Study, Argonne National Lab, 2005
**CO₂ Mitigation Options**

**Scale**
- Annual CO₂ (Billion Tonnes)
  - 2030
  - 2005

**Cost**
- $ per Tonne CO₂ Avoided

- NG
- Nuclear
- IGCC
- CCS
- Wind
- Engine Improvements

- Conventional Ethanol
- Full Hybrids
- Cellulosic Ethanol

**Power Generation**

**Light Duty Transport**


Biofuels do not include emerging land-impacts issues
Conclusions

• Economic progress, especially in developing countries, will drive global energy demand higher despite substantial efficiency gains

• Oil, natural gas and coal are indispensable to meeting this energy demand, even with rapid growth in renewables

• Significantly impacting CO₂ emissions requires global participation, step changes in energy efficiency, technology gains and massive investment