Outline

• Global energy trends
• Liquid fuels
• Transport demand
• Refining
• South Africa
four key drivers of the energy future

- **Demand Growth**
  - GDP growth
  - urbanisation

- **Sustainable Resources**
  - Diverse resources
  - non-conventionals

- **Environmental Constraints**
  - climate change
  - local emissions

- **Security of Supply**
  - import dependence
  - resource competition
Non-OECD economies to drive consumption growth

Energy Outlook 2030

Billion toe

1990 2000 2010 2020 2030

Billion toe

1990 2000 2010 2020 2030

Renewables*
Hydro
Nuclear
Coal
Gas
Oil
*Includes biofuels
Convergence of energy intensity and fuel shares

Energy intensity

Toe per thousand $2010 GDP

Shares of world primary energy

* Includes biofuels
Conclusion

Energy can be available and affordable
- Competition / Efficient Market
- Innovation / Technology
- Regulation / Energy policy

Energy security an issue

CO₂ emissions not on track

GDP, Energy and CO₂

Index (1970=100)

1970 1990 2010 2030
Outline

- Global energy trends
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Global liquids – demand and supply

<table>
<thead>
<tr>
<th>Mb/d</th>
<th>Demand</th>
<th>Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2030 level</td>
</tr>
<tr>
<td>80</td>
<td>85</td>
<td>90</td>
</tr>
<tr>
<td>85</td>
<td>90</td>
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<td>100</td>
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<tr>
<td>95</td>
<td>100</td>
<td>105</td>
</tr>
</tbody>
</table>

- **Demand**
  - China
  - India
  - S&C Am
  - Mid East
  - Other

- **Supply**
  - US
  - Brazil
  - Biofuels
  - Oil Sands
  - NGLs
  - Other
  - Saudi
  - Iraq
  - Other

**2010**

**Non-OECD Growth**

**OPEC Declines**

**Non-OPEC Declines**

**Non-OPEC Growth**

**Energy Outlook 2030**
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Vehicle growth concentrated in the Non-OECD

Total number of vehicles

- Non-OECD
- OECD

Vehicles per thousand people

- US
- Germany
- Japan
- South Africa
- China
- India

Energy Outlook 2030
Transport fuel demand is met predominantly by oil

By energy type

Projected car efficiency

Energy Outlook 2030
Policy and technology drive efficiency improvements

Passenger car sales by type

Global vehicle fleet in 2030

- Conventional incl. stop-start: 69%
- Mild hybrid: 16%
- Full hybrid: 11%
- Plug-ins incl. BEVs: 4%

Energy Outlook 2030
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Refinery utilisation (%)

Source: includes data from Parpinelli-Technon and ESAI.

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The implications for refining are stark

Global liquids supply and demand

Supply growth 2010-30

Total liquids 16 Mb/d

Other liquids: 1

Non-refined NGLs: 3

Biofuels: 3

=> Refined crude: 9

Aspac & PG have already announced >10Mb/d of new builds!

Energy Outlook 2030
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South Africa refining status

<table>
<thead>
<tr>
<th>Process utilization (%)</th>
<th>Operating cost ($/UEDC)</th>
<th>Capital investment ($/EDC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southeast Asia</td>
<td>Western Europe</td>
<td>South Africa</td>
</tr>
</tbody>
</table>

© BP 2012
South African Demand and Imports dependency:
Petroleum, Diesel and Kerosene

South Africa demand forecast

Global demand forecast

High imports case

SA Share of imports

12%

medium imports case

50%

30%

2030 imports diff = 180 Kb/d

Refinery utilisation
(72% → 82%)

Car efficiency
(low → high)

Economic growth
(4% → 3%)
South African gasoline and diesel imports

High Import Case

Medium Import Case

Kb/d

Petrol

Diesel

Share of diesel

Energy Outlook 2030

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“The Solution Set for South Africa”

- GDP is growing (BRICS)
- Urbanisation momentum
- Promote energy saving

Embrace Low “C” economy
- Cleaner Fuels (CF2)
- Renewables energy
- Manufacturing efficiency

Efficient Market
Technology
Energy Policy

- Increase diversity of resources
- Increase share of renewables
- Partner with neighbours

- Invest in existing refineries
- Increase capacity
- Address infrastructure bottleneck
Energy imbalances further improve Supply Opportunities in Africa

Key:
Billion toe

- Gas
- Oil
- Coal

Net importers
Net exporters

Energy Outlook 2030
Liquids demand driven by non-OECD transport

Liquids demand by sector

Liquids demand by product group

Energy Outlook 2030